

**NATIONAL WEATHER SERVICE INSTRUCTION 10-330
SEPTEMBER 9, 2010**

**Operations and Services
MARINE AND COASTAL WEATHER SERVICE PROGRAM, NWSPD 10-3**

OCEAN AND GREAT LAKES ICE SERVICES

NOTICE: This publication is available at: <http://www.nws.noaa.gov/directives/>

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It combines the former NWSI 10-330, Ocean Ice Services and NWSI 10-331, Great Lakes Ice Services, dated July 5, 2006, recertified August 22, 2008.

signed
David.B.Caldwell
Director, Office of Climate,
Water, and Weather Services

August 26, 2010
Date

OCEAN ICE SERVICES

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1. Introduction. This instruction describes the NWS Ocean and Great Lakes Ice Services.
2. Alaskan Ice Products. Forecasts, analyses, and advisories will be produced routinely throughout the year by the WFO Anchorage for the sea waters surrounding Alaska. Lake ice and icebergs or glacier ice detached from glaciers and floating in sea water are excluded.
3. Sea Ice Advisory. A 5 day Sea Ice Advisory will be issued three times a week on Mondays, Wednesdays, and Fridays.
 - 3.1 Mission Connection. The Sea Ice Advisory is an alphanumeric product that provides analysis, forecast, and climatological information pertaining to sea ice in the waters surrounding Alaska. The Sea Ice Advisory is critical for vessels in planning a safe route through waters routinely impacted by sea ice movement. This product is intended to provide information to assist in the protection of life and property and enhance the nation's economy.
 - 3.2 The Seasonal Ice Outlook. The Seasonal Ice Outlook should be included in the issuance of the first Sea Ice Advisory of each month and carried for a week.

The objective of the outlook is to identify a representative pattern year from the ice atlas for the outlook period.

4. Graphic Products. Graphic products should be issued 3 times weekly on Mondays, Wednesdays, and Fridays. Graphic products will be consistent with the concurrent text product. Graphic sea surface temperature analyses should be issued 2 times weekly on Tuesdays and Thursdays. In addition, the National Weather Service (NWS) and the National Ice Center (NIC) should confer on difficult sea ice analyses and forecasts. Products are made available via various means of dissemination such as: the Internet, File Transfer Protocol (ftp) E-Mail, and Marine Radio Facsimile Broadcast.

- 4.1 Ice Analysis. A graphical analysis of the sea ice conditions over the waters surrounding Alaska, West from the Kenai Peninsula to 171E and North to the Bering Sea and Arctic Ocean.
 - 4.1.1 Mission Connection. The Ice Analysis is a graphic depicting sea ice locations, concentrations, and thickness. The Ice Analysis is issued routinely to aid ships navigating the ice-covered waters surrounding Alaska. The information is critical for vessels in planning a safe route through waters routinely impacted by sea ice movement. This product is intended to provide information to assist in the protection of life and property and enhance the nation's economy.
 - 4.2 Cook Inlet Ice analysis. A detailed graphical analysis of the sea ice conditions over the waters of the Cook Inlet.

4.3 Sea Surface Temperature Analysis. A graphical depiction of sea water temperatures for the areas surrounding Alaska which includes the latest ice edge.

4.3.1 Mission Connection. The Sea Surface Temperature Analysis is a graphic depicting sea surface temperature contours for the waters surrounding Alaska. The product is issued routinely to provide sea surface temperature information to vessels operating in the waters around Alaska. It complements the suite of sea ice graphics issued for this region. The Sea Surface Temperature Analysis product is intended to provide information to assist in the protection of life and property and enhance the nation's economy.

4.4 Five Day Sea Ice Forecast. A graphical 5 day forecast, showing expected ice conditions over the waters surrounding Alaska.

4.4.1 Mission Connection. The Five Day Sea Ice Forecast is a graphic depicting forecast sea ice conditions over the waters surrounding Alaska valid at the day five period. The Five Day Sea Ice Forecast is issued routinely updated when necessary, to aid ships navigating the sea waters surrounding Alaska. The information is critical for vessels in planning a safe route through waters routinely impacted by sea ice movement. This product is intended to provide information to assist in the protection of life and property and enhance the nation's economy.

5. Marine Weather Statement. Ice also forms in various bays and coastal areas of the 48 contiguous states. Marine Weather Statements (MWSs) may be used to alert mariners of such conditions in their marine area if, in the forecaster's judgment, they may be hazardous to shipping.

5.1 Mission Connection. Marine Weather Statements provide the public with detailed marine weather information describing non-severe, but potentially hazardous conditions; and to provide information for a variety of conditions not covered by warnings or routine forecasts. WFOs should issue MWSs if, in the forecaster's judgment, ice conditions are forecast to be hazardous to shipping.

6. Great Lakes Ice Services. Great Lakes ice services provide lake ice observations, forecasts, outlooks, and advisories during the months in which ice cover on the lakes and their connecting passages impacts shipping; usually between December and April. This instruction describes the NWS Great Lakes Ice Services.

7 Great Lakes Products.

7.1 Great Lakes Ice Outlook. During the ice season, WFO Cleveland will issue a 5 day ice forecast/advisory product on Monday, Wednesday, and Friday of each week at about 4 p.m., local time. It should include expected synoptic weather patterns and temperatures over the next 5 days and expected winds for the first 36 hours of the period covered by the forecast. It should also include, when available, additional information such as normal temperatures, effects of ice on navigation, the accumulated freezing degree days, and observed ice thicknesses.

7.1.1 Mission Connection. The Great Lakes Ice Outlooks are alphanumeric products that provide analysis, forecast, and climatological information pertaining to ice in the waters of the Great Lakes. They are critical for vessels in planning a safe route through waters routinely impacted by ice movement. These products are intended to provide information to assist in the protection of life and property and enhance the nation's economy.

7.2 Freeze-up Outlooks.

7.2.1 Great Lakes Freeze-Up Outlook. For Lakes above Lake Ontario, WFO Cleveland will issue a freeze-up outlook during the first and third week of each month from November through December depending on existing ice conditions. It will indicate whether ice conditions will occur earlier, later, or about the normal times over the Lakes, and should be consistent with the 30 and 90 day outlooks of the NIC. Include in the Outlook supporting data such as selected water temperatures from water intakes and from NOAA data buoys.

7.2.2 Outlook for Freeze-up on the St. Lawrence River. WFO Buffalo will issue an outlook for freeze-up on the St. Lawrence River at Massena, New York during the first and third week of each month from November through December depending on existing ice conditions. It may be issued at other times if, in the forecaster's judgment, conditions significantly differ from the current outlook. The outlook should be consistent with 30 and 90 day outlooks of the NIC. Other ice products are normally not needed for Lake Ontario and the St. Lawrence River because the Welland Canal and the river usually close in December.

7.3 Great Lakes Break-up Outlook for the Opening of Navigation. WFO Cleveland will issue this outlook once in the spring on or before March 15. Include a summary of current ice thicknesses and a listing of dates when shipping is expected to be able to navigate an area without icebreaker assistance across all the Lakes.

7.4 Ice Advisories. Forecasters will use the headline "Ice Advisory" in the ice forecast when, in their judgment, conditions are expected that could cause changes adversely affecting ships already underway or trapping ships that are not yet underway. Guidelines for the headlines are:

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- a. Sustained winds of 25 KT or greater for a minimum of 12 hours. (These conditions are a concern because of the strong ice pressures that they generate.)
- b. The likelihood of rapid ice drift closing active shipping areas. Rapid ice drift is defined as a drift speed of greater than 10 nm per day for freely moving ice.
- c. A drop in temperatures which will result in moderate to rapid ice growth.

7.4.1 Mission Connection. The Ice Advisory is an alphanumeric product that provides current and forecast information pertaining to ice in the waters of the Great Lakes. The Ice Advisory is critical for vessels in planning a safe route through waters routinely impacted by lake ice movement. This product is intended to provide information to assist in the protection of life and property and enhance the nation's economy.

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1. Examples of Alaskan Ice Products.

1.1 Alaskan Sea Ice Advisory.

FZAK80 PAFC

ICEAFC

SEA ICE ADVISORY FOR WESTERN AND ARCTIC ALASKAN COASTAL WATERS

NATIONAL WEATHER SERVICE ANCHORAGE ALASKA

ISSUED 336 PM AST WED 12 MAR 2003

FORECAST VALID MON 17 MAR 2003

PLEASE CALL THE ICE FORECASTER AT 907 266 5113 OR FAX TO ICE DESK AT 907 266 5188 OR EMAIL TO NWS.AR.ICE@NOAA.GOV IF THE ANALYSIS IN YOUR AREA IS WRONG. TYPE THE FOLLOWING URL IN LOWER CASE... PAFC.ARH.NOAA.GOV/ICE.PHP TO OBTAIN A GRAPHIC DEPICTION OF THE ICE ANALYSIS AND 5 DAY ICE FORECAST ON THE INTERNET. PLEASE NOTE THAT TIMELY DELIVERY OF DATA AND PRODUCTS THROUGH THE INTERNET IS NOT GUARANTEED.

CONFIDENCE...MODERATE TO HIGH FOR THE BERING SEA AND MODERATE FOR COOK INLET.

ARCTIC OCEAN.
SEA ICE COVERED.

BERING SEA.
AREA 9A. NORTON SOUND...SLEDGE ISLAND TO NUNAKTUK ISLAND.
AREA 9B. ST. LAWRENCE WATERS...DALL POINT TO WALES.
SEA ICE COVERED.

AREA 14 ST. MATTHEW ISLAND WATERS.
AREA 8. CAPE NEWENHAM TO DALL POINT.
AREA 6A. BRISTOL BAY NORTH PORTION FROM CAPE NEWENHAM TO PORT HEIDEN.

4 TO 8 TENTHS NEW ICE LIES IN KVICHAK AND NUSHAGAK BAYS NORTH OF A CURVE FROM 58.6N 157.5W TO 58.5N 158.3W TO CAPE CONSTANTINE.

THE MAIN ICE EDGE LIES NORTH OF A CURVE FROM 59.1N 161.8W TO 59.1N 162.2W TO 59.5N 162.3W TO 59.2N 163W TO 59N 163.8W TO 59.4N 168W TO 59.6N 167.7W TO 59.8N 174W TO 59.5N 174.3W TO 59.4N 175.3W TO 59.7N 176.8W TO 60.1N 177.2W TO 60.2N 176.7W TO 60.9N 180 TO 60.8N 179E TO 61.5N 176.5E TO 61.3N 175.3E TO

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61.5N 174.2E TO 61.2N 173.5E TO 61.4N 173.4E TO 60N 170E AND
SOUTHWEST.

EAST OF 164W...THE ICE EDGE IS 4 TO 6 TENTHS NEW ICE. WEST OF
164W...THE ICE EDGE IS 1 TO 10 TENTHS FIRST YEAR THIN...YOUNG AND
NEW ICE OFTEN LYING IN STRIPS. THE MAIN PACK ICE LIES WITHIN
25 NM OF THE ICE EDGE.

THE ICE EDGE IS 155 NM NORTH OF ST. PAUL ISLAND AND 90 NM
SOUTHWEST OF ST. MATTHEW ISLAND.

FORECAST THROUGH MONDAY.
HIGH PRESSURE WILL PERSIST OVER NORTHERN ALASKA THROUGH THURSDAY.

A LARGE LOW COMPLEX 450 NM SOUTHWEST OF KETCHIKAN WILL MOVE TO
THE NORTHERN GULF OF ALASKA MONDAY.

EAST OF 170W...THE ICE EDGE WILL MOVE 28 NM TO THE SOUTHWEST BY
MONDAY AFTERNOON.

WEST OF 170W...THE ICE EDGE WILL MOVE 12 NM TO THE WEST WITH MOST
OF THE MOVEMENT OCCURRING BY FRIDAY MORNING.

COOK INLET.

THE MAIN ICE EDGE LIES NORTH OF A CURVE EXTENDING FROM 20 NM
SOUTHWEST OF POINT POSSESSION TO 17 NM WEST SOUTHWEST OF
POINT POSSESSION TO 5 NM WEST SOUTHWEST OF POINT POSSESSION TO
THE NORTH FORELAND. THE ICE EDGE IS 4 TO 10 TENTHS NEW ICE. OPEN
WATER LIES NEXT TO THE SUSITNA RIVER MUD FLATS.

SHOREFAST ICE LIES ON THE SUSITNA RIVER...TRADING BAY AND
FIRE ISLAND MUD FLATS.

7 TO 8 TENTHS NEW ICE LIES IN TUXEDNI BAY.

4 TO 6 TENTHS NEW ICE LIES IN CHINITNA BAY.

THE REST OF COOK INLET IS SEA ICE FREE.

FORECAST THROUGH MONDAY.
HIGH PRESSURE WILL PERSIST OVER NORTHERN ALASKA THROUGH THURSDAY.

A LARGE LOW COMPLEX 450 NM SOUTHWEST OF KETCHIKAN WILL MOVE TO THE NORTHERN GULF OF ALASKA MONDAY.

WELL BELOW NORMAL TEMPERATURES WILL WARM TO BELOW NORMAL BY SUNDAY. NORTHERLY WINDS WILL PERSIST THROUGH MONDAY.

NEW ICE WILL CONTINUE TO FORM NORTH OF THE EAST AND WEST FORELANDS THROUGH MONDAY.

NEW ICE WILL CONTINUE TO FORM IN TUXEDNI AND CHINITNA BAYS THROUGH MONDAY.

PAGE MAR 03

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1.1.1 Examples of Alaskan Sea Ice Advisories With a Seasonal Ice Outlook.

FZAK80 PAFC
ICEAFC

SEA ICE ADVISORY FOR THE WESTERN AND ARCTIC ALASKAN COASTAL WATERS
NATIONAL WEATHER SERVICE ANCHORAGE ALASKA
3:45 PM AST WED 3 JAN 2001

(...Sea ice advisory information...)

OUTLOOK FOR THE WINTER...

THE SEA ICE ON MONDAY 1 JANUARY 2001 LOOKS MOST LIKE 1985. 1999 IS A VERY DISTANT SECOND PLACE YEAR. ONE HAS TO SUBTRACT 3 WEEKS TO HAVE A SIMILAR ICE EDGE SHAPE...JANUARY 1 2001 ICE EDGE LOOKS MOST LIKE 7 DECEMBER 1998

NO OTHER YEARS ARE CLOSE.

BASED ON 1985...THE ICE EDGE WILL BE WELL NORTHEAST OF ST PAUL AND ST MATHEWS ISLANDS FOR THE OPILIO CRAB SEASON. THE ICE EDGE WILL MOVE TOWARD THE WEST SOUTHWEST IN THE BERING SEA AS THE ALASKA MAINLAND BECOMES COLDER THIS MONTH. COOK INLET ICE EDGE WILL APPROACH NORMAL BY THE END OF THE MONTH BUT THE SEA ICE WILL BE MUCH THINNER THAN NORMAL

HOPKINS JAN 01

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1.1.1.a Outlook for the Late Winter and Early Spring

FZAK80 PAFC
ICEAFC

SEA ICE ADVISORY FOR THE WESTERN AND ARCTIC ALASKAN COASTAL
WATERS
NATIONAL WEATHER SERVICE ANCHORAGE ALASKA
4 PM AST MON 5 FEB 2001

(...Sea ice advisory information...)

OUTLOOK FOR LATE WINTER AND EARLY SPRING...

THE ICE EDGE IN THE BERING SEA AS OF WEDNESDAY 31 JANUARY 2001
CONTINUES TO LOOK MOST LIKE 1985. NO OTHER YEAR IS CLOSE IN SHAPE.

\$\$

1.1.1.b Outlook for the Spring and Early Summer

FZAK80 PAFC
ICEAFC

SEA ICE ADVISORY FOR THE WESTERN AND ARCTIC ALASKAN COASTAL
WATERS
NATIONAL WEATHER SERVICE ANCHORAGE ALASKA
3 PM AST MON 1 MAY 2001

(...Sea ice advisory information...)

OUTLOOK FOR THE SPRING AND EARLY SUMMER...

THE ICE EDGE AS OF MAY 01 LOOKS MOST LIKE 1996. 1988 AND 1993 ARE IN
SECOND AND THIRD PLACE.

\$\$

2. Marine Weather Statement Example.

FZUS73 KDTX 072113
MWSDTX
LHZ421-070300-

MARINE WEATHER STATEMENT
NATIONAL WEATHER SERVICE DETROIT/PONTIAC MI
413 PM EST SUN 7 JAN 2001

..SEA ICE RAPIDLY DEVELOPING IN SAGINAW BAY...

A FRIGID ARCTIC HIGH ARRIVED A DAY EARLIER THAN EXPECTED ACROSS LAKE HURON. TEMPERATURES BELOW ZERO HAVE CAUSED EXTENSIVE ICE GROWTH AROUND BAY CITY ACCORDING TO THE UNITED STATES COAST GUARD HINDERING SHIPPING INTO THAT PORT. SHIPPERS IN THE BAY CITY AREA SHOULD BE ALERT AND CONTACT THE COAST GUARD FOR ASSISTANCE AND INSTRUCTIONS.

THIS STATEMENT WILL BE UPDATED AT 10 PM EST TONIGHT.

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APPENDIX B- EXAMPLES OF GREAT LAKES PRODUCTS

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1. Great Lakes Ice Outlook. (This example would be typical of an early winter.)

FZUS81 KCLE 222055 RRA
 ICELIO

GREAT LAKES ICE OUTLOOK
 NATIONAL WEATHER SERVICE CLEVELAND OH
 400 PM EST (DAY OF THE WEEK...MON, WED, OR FRI) 22 DEC 2000

A LOW NORTHEAST OF THE SAULT STE MARIE AREA WILL MOVE EAST AND OUT OF THE LAKES AREA TONIGHT. A COLD FRONT EXTENDING SOUTHWESTWARD FROM THE LOW THROUGH ILLINOIS WILL MOVE SOUTHEAST AND BECOME STATIONARY SOUTH OF THE LOWER LAKES. A SECOND LOW WILL MOVE OUT OF THE DAKOTAS AND ALONG THE FRONT PASSING OVER THE LOWER LAKES REGION ON MONDAY. A LOW NORTHEAST OF THE SAULT STE MARIE AREA WILL MOVE EAST AND OUT OF THE LAKES AREA TONIGHT. A COLD FRONT SOUTHWEST FROM THE LOW THROUGH ILLINOIS WILL MOVE SOUTHEAST AND BECOME STATIONARY SOUTH OF THE LOWER LAKES. ARCTIC HIGH PRESSURE WILL BUILD OVER THE LAKES INTO THE MIDDLE OF NEXT WEEK.

GALE WARNINGS ARE IN EFFECT TONIGHT FOR LAKE SUPERIOR AND LAKE MICHIGAN. WINDS WILL BECOME WEST TO NORTHWEST OVER ALL THE LAKES TONIGHT AND SATURDAY. OVER THE NORTHERN LAKES WINDS WILL BECOME NORTHEAST TO NORTH SUNDAY BACKING TO NORTHWEST AND WEST SUNDAY NIGHT.

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TEMPERATURES WILL BECOME MUCH COLDER OVER ALL THE LAKES BY THE END OF THE WEEKEND WITH READINGS WELL BELOW NORMAL BY THE FIRST PART OF NEXT WEEK. ICE GROWTH WILL BECOME MODERATE TO RAPID IN ALL AREAS BY THE END OF THE WEEKEND. THE MOST SIGNIFICANT GROWTH IS LIKELY IN THE BAYS AND HARBORS ALONG LAKE SUPERIOR...SOUTHERN GREEN BAY...AND IN WESTERN LAKE ERIE FROM THE DETROIT RIVER LIGHT TO SOUTHEAST SHOAL. NAVIGATION COULD BECOME DIFFICULT IN THOSE AREAS BY NEXT WEEK.

THE COAST GUARD CUTTER KATMAI BAY IN THE LOWER ST MARYS RIVER REPORTED 30 PERCENT COVERAGE OF 1 INCH ICE FROM PT AUX FRENES TO SWEETS POINT. THERE WAS OPEN WATER FROM THE LOCKS TO PT AUX FRENES.

1.1 Monday Portion of the Ice Outlook (appended on Mondays)

NORMAL TEMPERATURES FOR SELECTED LOCATIONS AROUND THE GREAT LAKES FOR THE PERIOD 18 DECEMBER 2000 THROUGH 25 DECEMBER 2000:

LOCATION	HIGH	LOW	LOCATION	HIGH	LOW
DULUTH, MN	49	30	MUSKEGON, MI	56	37
MARQUETTE, MI	48	28	ALPENA, MI	52	31
SAULT STE MARIE, MI	49	30	DETROIT, MI	59	38
GREEN BAY, WI	55	35	TOLEDO, OH	60	37
MILWAUKEE, WI	55	36	CLEVELAND, OH	59	39
CHICAGO, IL	60	40	BUFFALO, NY	55	37

1.2 Wednesday Portion of the Ice Outlook (appended on Wednesdays)

FREEZING DEGREE DAY ACCUMULATIONS AT SELECTED STATIONS THROUGH THE DAY (19 DECEMBER 2000) COMPARED TO NORMAL FOR THAT DAY:

LOCATION	2000	NORM	LOCATION	2000	NORM
DULUTH, MN	500	580	MUSKEGON, MI	58	60
MARQUETTE, MI	443	450	ALPENA, MI	220	240
SAULT STE MARIE, MI	390	400	DETROIT, MI	50	62
GREEN BAY, WI	230	320	TOLEDO, OH	45	53
MILWAUKEE, WI	224	240	CLEVELAND, OH	10	12
CHICAGO, IL	113	120	BUFFALO, NY	100	110

1.3 Friday Portion of the Ice Outlook (appended on Fridays)

...ICE THICKNESSES AROUND THE GREAT LAKES BASED ON U.S. COAST GUARD REPORTS...

LOCATION	ICE THICKNESS IN INCHES
-----	-----
DULUTH	23 80 PERCENT
BAYFIELD	24
MARQUETTE	2
ST. IGNACE	12
ESCANABA	16
SHEBOYGAN	1
STURGEON BAY	10
CALUMET HARBOR	6 20 PERCENT
LUDINGTON	4 10 PERCENT
CHARLEVOIX	12
TAWAS	16
LORAIN	2
ASHTABULA	1
ERIE	2
BUFFALO	14

THIS FORECAST WILL NOT BE UPDATED UNTIL THE NEXT ISSUANCE 330 PM MONDAY 25 DEC.

LOMBARDY DEC 2000.

2. St. Lawrence Freeze Update Outlook.

FZUS81 KBUF 151735 RRA
ICEFBO

ST LAWRENCE FREEZE UP DATE OUTLOOK
NATIONAL WEATHER SERVICE BUFFALO NY
1235 PM EST WED 15 NOV 2000

THE DATE OF THE FIRST FREEZE UP OF THE ST LAWRENCE RIVER NEAR MASSENA NEW YORK IS FORECASTED TO BE 1 JAN 2001.

NADOLSKI NOV 2009

3. Great Lakes Freeze Up Outlook.

FZUS81 KCLE 012055 RRA
ICEFBO

GREAT LAKES FREEZE-UP OUTLOOK
NATIONAL WEATHER SERVICE CLEVELAND OH
400 PM EST WED 1 NOV 2000

FREEZE-UP IN THE BAYS AND HARBORS AROUND LAKE SUPERIOR AND NORTHERN LAKE MICHIGAN WILL OCCUR A LITTLE EARLIER THAN NORMAL THIS YEAR. FREEZE-UP AROUND SOUTHERN LAKE MICHIGAN AND NORTHERN LAKE HURON WILL OCCUR AROUND THE NORMAL TIMES WHILE

FREEZE-UP AROUND LAKE ERIE AND SOUTHERN LAKE HURON IS EXPECTED TO BE LATER THAN NORMAL THIS WINTER.

THE THIRTY DAY OUTLOOK FOR NOVEMBER IS FOR TEMPERATURES TO AVERAGE BELOW NORMAL AROUND THE LAKES REGION.

ANNUAL HARBOR WATER TEMPERATURES COMPARED TO PREVIOUS YEARS:

	2000	1999	1998	1997	1996	1995	1994
DULUTH	46	42	45	46	48	46	43
SAULT STE MARIE	48	48	46	46	50	46	44
CHICAGO	50	53	54	50	NA	NA	NA
MUSKEGON	54	54	56	47	56	52	48
ALPENA	51	49	51	47	49	45	44
DETROIT	54	52	55	50	54	51	46
CLEVELAND	61	59	61	55	57	53	52
BUFFALO	55	57	57	54	55	50	49

ANNUAL WATER TEMPERATURES FOR THE MID-LAKE AREAS AS RECEIVED FROM NOAA DATA BUOYS COMPARED TO PREVIOUS YEARS:

	2000	1999	1998	1997	1996
LAKE SUPERIOR					
WEST	44	42	43	45	45
NORTH-CENTRAL	43	43	44	44	42
EAST	43	46	44	45	44

LAKE MICHIGAN

NORTH	50	53	54	54	51
SOUTH	55	52	55	54	48

LAKE HURON

NORTH	49	51	50	49	49
SOUTH	52	50	53	50	50

LAKE ERIE

WEST	55	NA	60	54	55
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GARNET NOV 2000

4. Great Lakes Ice Outlook for the Opening of Navigation.

FZUS81 KCLE 052055 RRA
ICEFBO

GREAT LAKES BREAK-UP OUTLOOK
NATIONAL WEATHER SERVICE CLEVELAND OH
400 PM EST MON 5 MAR 2001

THE FOLLOWING ARE THE LATEST ANNUAL ICE THICKNESS REPORTS:

DULUTH	13 INCHES
MARQUETTE	12 INCHES
WHITEFISH BAY	15 INCHES
ST. MARYS RIVER	14-20 INCHES
GREEN BAY	
ESCANABA	30 INCHES REMAINDER OF BAY NO REPORTS
STRAITS MACKINAC	12 INCHES
SAGINAW BAY	8 INCHES
LAKE ST. CLAIR	6-8 INCHES
WESTERN LAKE ERIE	6-10 INCHES
BUFFALO	20 INCHES

FOLLOWING ARE EXPECTED DATES WHEN ICE CONDITIONS BECOME SUCH THAT
HIGH POWERED VESSELS CAN TRANSIT WITHOUT ICEBREAKERS:

DULUTH	APRIL 20
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MARQUETTE	APRIL 12
WHITEFISH BAY	APRIL 16
ST. MARY'S RIVER	APRIL 13
GREEN BAY	
ESCANABA	APRIL 7
REMAINDER OF BAY	APRIL 10
STRAITS OF MACKINAC	APRIL 8
GRAND TRAVERSE BAY	MARCH 20
SAGINAW BAY	MARCH 31
SOUTHERN LAKE HURON	MARCH 25
LAKE ST. CLAIR	MARCH 28
WESTERN LAKE ERIE	MARCH 31
BUFFALO	APRIL 22

BROWN MAR 2001

5. Great Lakes Ice Advisory.

FZUS81 KCLE 262055 RRA
ICELIO

GREAT LAKES ICE ADVISORY
NATIONAL WEATHER SERVICE CLEVELAND OH
400 PM EST MON 29 FEB 2005

...AN ICE ADVISORY FOR LAKE SUPERIOR TUESDAY THROUGH FRIDAY...AN ICE ADVISORY WEDNESDAY THROUGH FRIDAY FOR BAYS AND HARBORS ON THE SOUTHERN WATERS OF LAKES MICHIGAN AND HURON...LAKE SAINT CLAIR AND WESTERN LAKE ERIE...

A DEEP LOW NEAR LAKE WINNIPEG TONIGHT WILL MOVE SOUTHEAST ACROSS LAKE SUPERIOR TUESDAY...CONTINUING SOUTHEAST OVER MICHIGAN WEDNESDAY AND THURSDAY...THEN CURVING NORTHEAST ACROSS LAKE ERIE FRIDAY. A STRONG HIGH WILL BE BUILDING IN BEHIND THIS LOW. A COLD FRONT SOUTHWEST FROM THE LOW CENTER TONIGHT WILL EXTEND ACROSS NORTHERN WISCONSIN TUE...AND MOVE SOUTHEAST ACROSS LAKE MICHIGAN WED.

WINDS WILL SHIFT TO NORTHWEST BEHIND THE FRONT AND INCREASE TO NEAR GALE FORCE OVER WESTERN LAKE SUPERIOR TUESDAY AND OVER LAKE MICHIGAN WEDNESDAY. THIS MAY CLOSE NAVIGATION ALONG CHANNELS AND

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BAYS WITH NORTHWESTERLY EXPOSURES FROM IRONWOOD TO COPPER HARBOR. WEST TO SOUTHWEST WINDS OVER THE EASTERN LAKES WILL SHIFT TO SOUTH AND SOUTHEAST LATER IN THE WEEK AS THE LOW APPROACHES.

TEMPERATURES WILL DROP TO WELL BELOW NORMAL THIS WEEK CAUSING SIGNIFICANT ICE FORMATION AND GROWTH. AS ARCTIC COLD AIR OVERSPREADS THE LAKES THIS WEEK...A SIGNIFICANT PERIOD OF ICE FORMATION AND GROWTH IS LIKELY ON SHALLOW WATER AREAS THROUGHOUT THE LAKES. ON THE NORTHERN WATERS...FORMATION WILL BE RAPID THROUGH TUESDAY...BECOMING MODERATE ON WEDNESDAY. THIS INCLUDES WHITEFISH BAY...THE SAINT MARYS RIVER...GREEN BAY AND THE STRAITS. ON SOUTHERN WATERS...MODERATE GROWTH AND FORMATION IS EXPECTED THROUGH TUESDAY WITH SLOW GROWTH AND FORMATION ON WEDNESDAY. THIS INCLUDES SAGINAW BAY...LAKE SAINT CLAIR AND THE WESTERN BASIN OF LAKE ERIE.

THE US COAST GUARD CUTTER BISCAYNE IN THE STRAITS OF MACKINAC MONDAY REPORTED 80% COVERAGE OF 3 TO 4 INCH ICE FROM LANSING SHOAL TO WHITE SHOAL AND 2 TO 3 INCHES OF ICE COVERING 40% OF THE AREA FROM THE BRIDGE TO ROUND ISLAND. THE SUNDEW IN THE DULUTH AREA REPORTED 6 TO 16 INCHES OF ICE IN DULUTH HARBOR AND 12 TO 20 INCHES OF ICE IN THE EAST GATE BASIN.

THIS FORECAST WILL NOT BE UPDATED UNTIL THE NEXT ISSUANCE 400 PM WEDNESDAY 2 MARCH 2005.

THURM FEB 05