

Prepared by the North American Ice Service

**A collaboration of the Canadian Ice Service and
the National/Naval Ice Center**

1 December 2006

**Seasonal Outlook
Great Lakes
Winter 2006-2007**



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Great Lakes

WINTER 2006-2007

Introduction

This outlook of the expected pattern, timing, and the extent of ice growth attempts to identify areas and periods where conditions should be more or less favourable than normal. It has been developed through an analysis of the oceanographic and meteorological parameters for the summer and the fall proceeding the ice season. These conditions are compared with earlier years, the December wind and temperature forecasts plus the seasonal temperature outlook. A prediction of the ice regime is then produced. **It should be noted that significant variations of these conditions will have an impact on the timing and extent of ice formation.**

Throughout the winter, this outlook will be updated by a twice monthly issue of 30-day forecasts. These forecasts will also indicate the beginning of the spring break-up process throughout the area. Daily radio broadcasts of ice charts and forecasts will be made to support ongoing operations in the various areas where ice affects marine activity. For more information regarding the broadcast schedule, please consult the following Canadian Coast Guard web site (Appendix B - General information from the Canadian Coast Guard).

<http://www.ccg-gcc.gc.ca/mcts-sctm/ramn/docs/aa.ae/index.htm#part5>.

General Seasonal Outlook

As we head into another winter season, the media are talking about the developing El Nino predicted by various governmental agencies. In particular, the Climate Prediction Center (CPC) of the National Oceanic and Atmospheric Administration (NOAA) is forecasting El Nino conditions during the next 3 months and will likely continue through the spring of 2007. At the current time, CPC is anticipating a weak to moderate El Nino during the winter months. Overall the temperature trend for the upcoming winter will see the western lakes in an above normal regime whereas the eastern portion of the lakes will exhibit conditions approaching near normal. Temperatures over the entire winter will however show signs of periodic swings between above and below normal notwithstanding the general trend.

The summer and fall of 2006 was characterized by generally mild weather. In particular, the months of June, July and August had above normal temperatures. However by the month of September, a cooling trend had begun to establish itself especially over the southern portion of the Great Lakes. By the month of October all of the lakes were below normal. The overall effect during the June to October timeframe was generally near to slightly above normal temperatures of the entire Great Lakes region. During the month of November, a general south-westerly circulation covered the area. The net effect was to generate a westerly circulation over the Great Lakes region. Hence, temperatures were above normal over the entire area for the month. Above normal temperatures ranged from 1.5°C above at Windsor to 3.0°C at Thunder Bay.

The surface water temperature anomalies over the Great Lakes on November 22 are depicted in Figure 3. In general water temperatures were near normal over most lakes except for western Lake Erie where water temperatures were slightly below normal. The figure shows that temperatures ranged from near normal over most of the lakes to 0.5 to 1°C below normal in western Lake Erie.

At the end of November, generally ice free conditions prevailed over the Great Lakes.

The forecast for December is for above normal air temperatures for the western section of the Great Lakes region while the central and eastern parts will be near to slightly below normal. Freeze-up over Lake Superior will be near normal while the rest of the lakes will experience near to slightly earlier than normal ice formation.

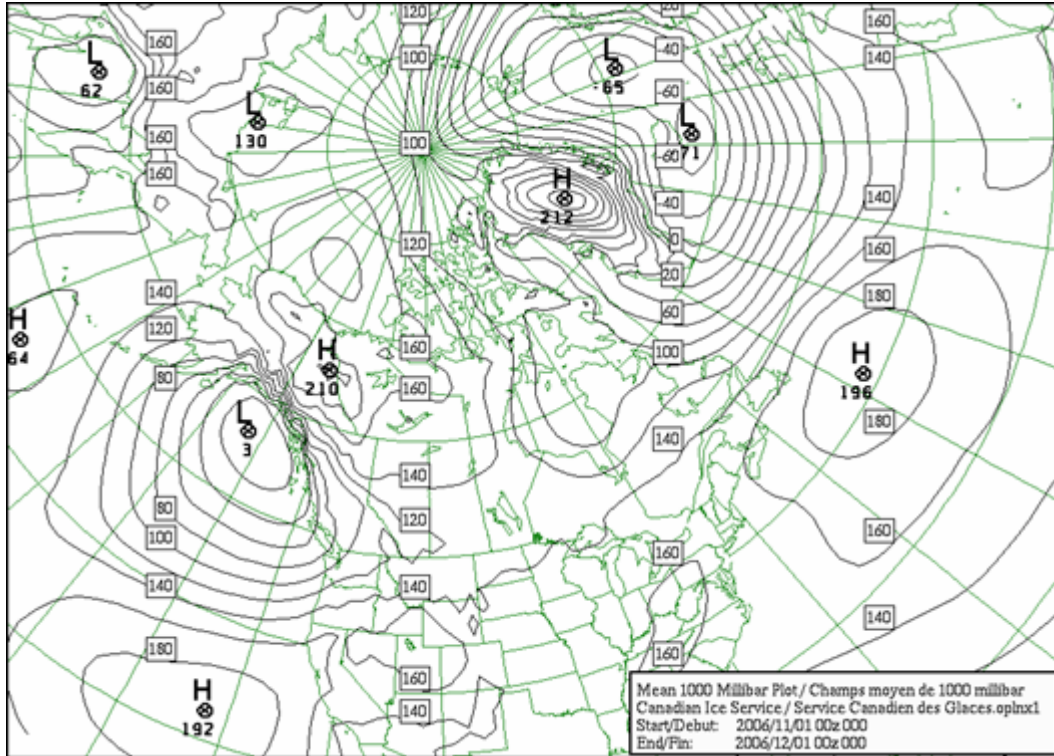


Figure 1: 1000 mb pressure pattern - November 2006

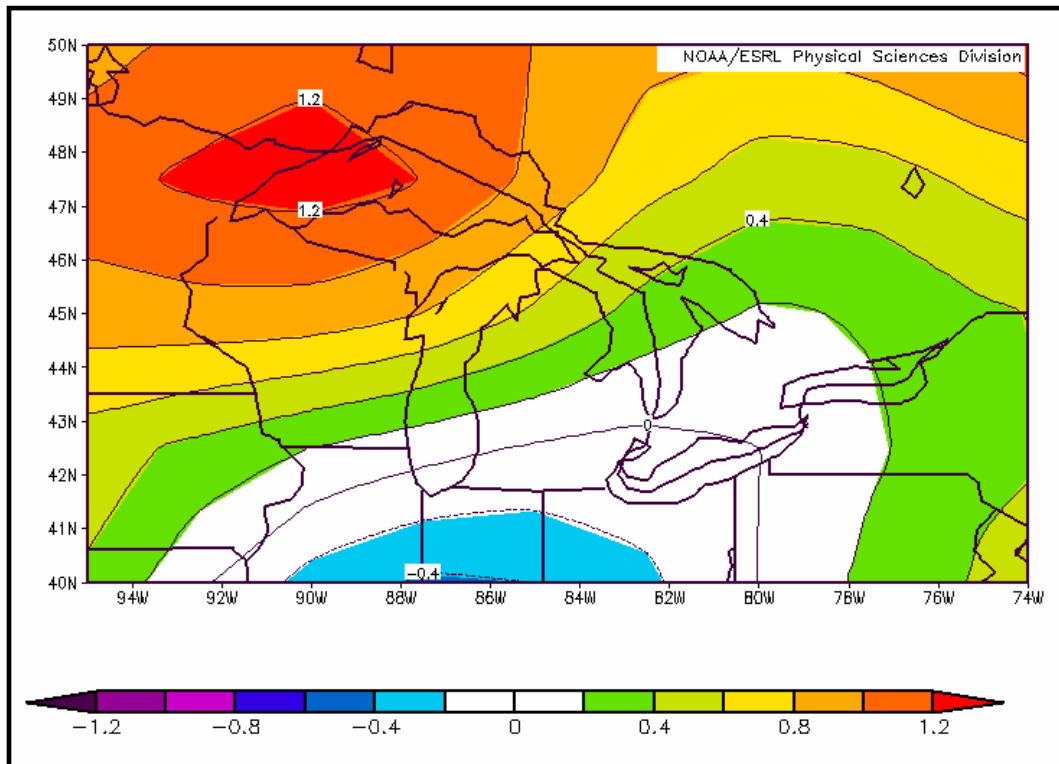


Figure 2: Air temperature anomalies over the Great Lakes – June 1 to October 31, 2006.

	Normal Temperatures	Observed	Departure
Duluth	-2.4	0	2.4
Thunder Bay	-2.9	0.1	3.0
Gore Bay	1.6	3.3	1.7
Sault Ste Marie	0.5	2.4	1.9
Chicago	4.4	6.1	1.7
Wiaarton	2.6	4.7	2.1
Windsor	4.6	6.1	1.5
Buffalo	4.6	6.9	2.3
Toronto	3.1	5.3	2.2
Trenton	2.5	5	2.5
Average	1.9	4.0	2.1

Table 1: Departure from Normal Temperatures - November 2006

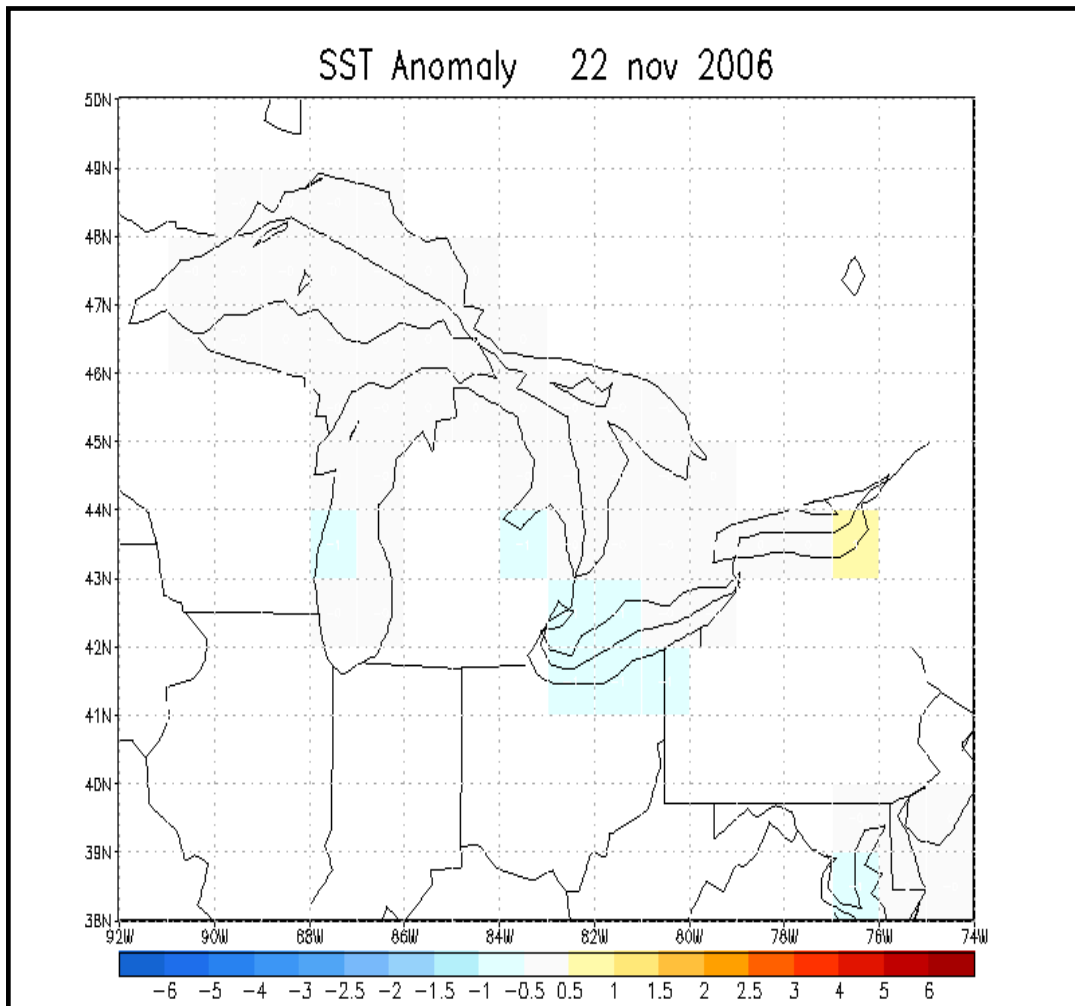


Figure 3: Sea surface temperature anomalies - 22 November 2006 (NCEP)

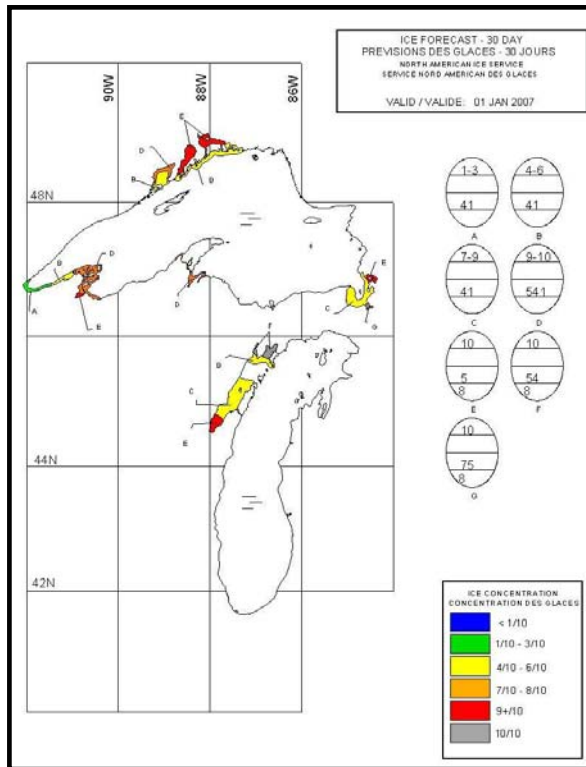


Figure 4: Expected ice Conditions - Western Great Lakes - 1 January 2007

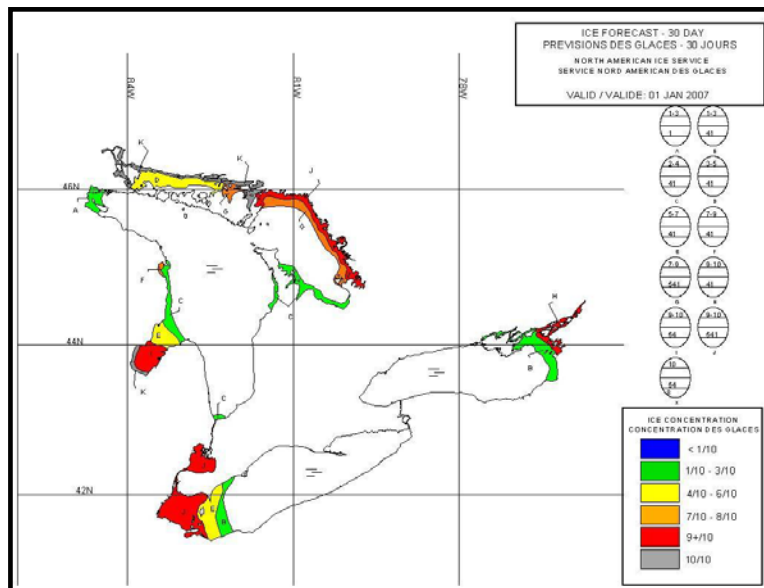


Figure 5: Expected ice Conditions - Eastern Great Lakes - 1 January 2007

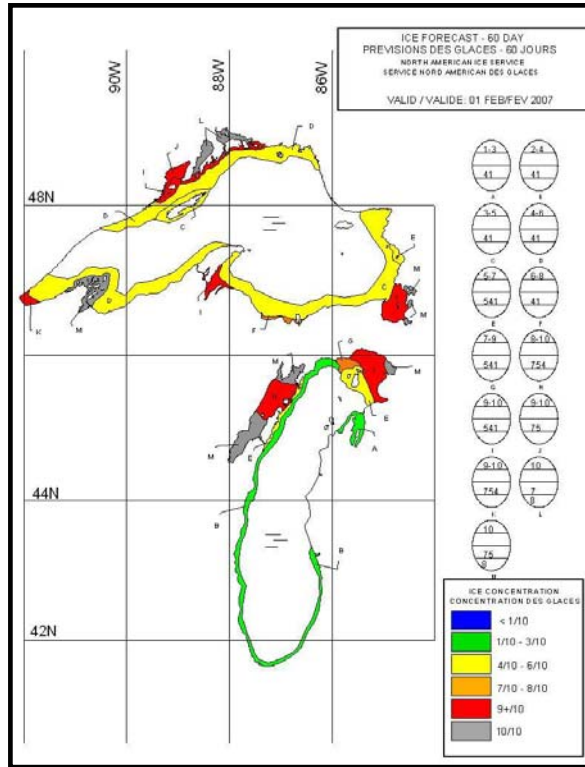


Figure 6: Expected ice Conditions - Western Great Lakes - 1 February 2007

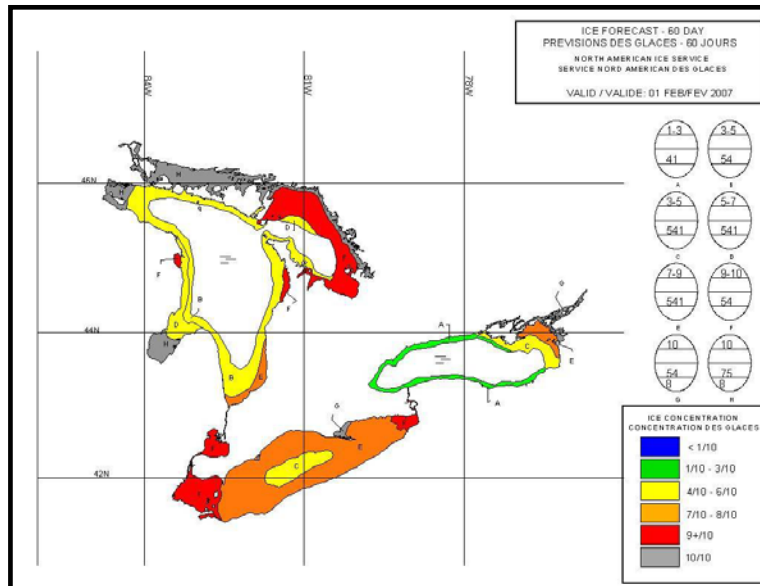


Figure 7: Expected ice Conditions - Eastern Great Lakes - 1 February 2007

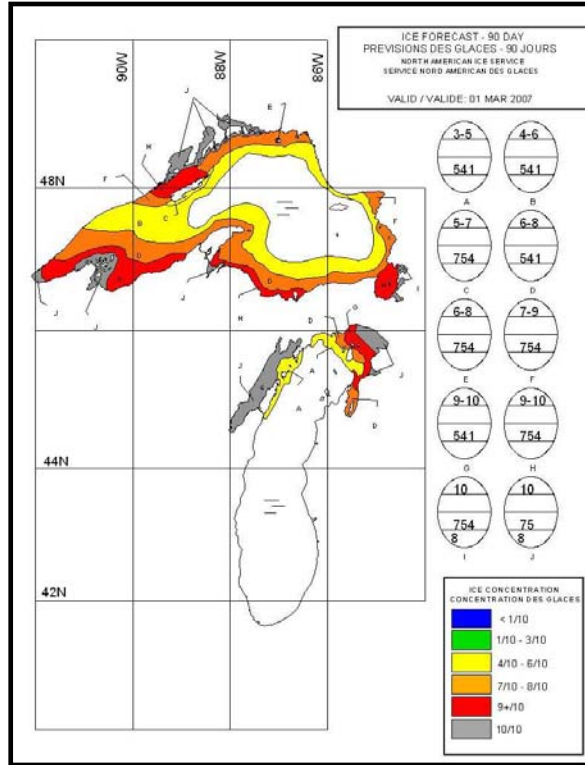


Figure 8: Expected ice Conditions - Western Great Lakes - 1 March 2007

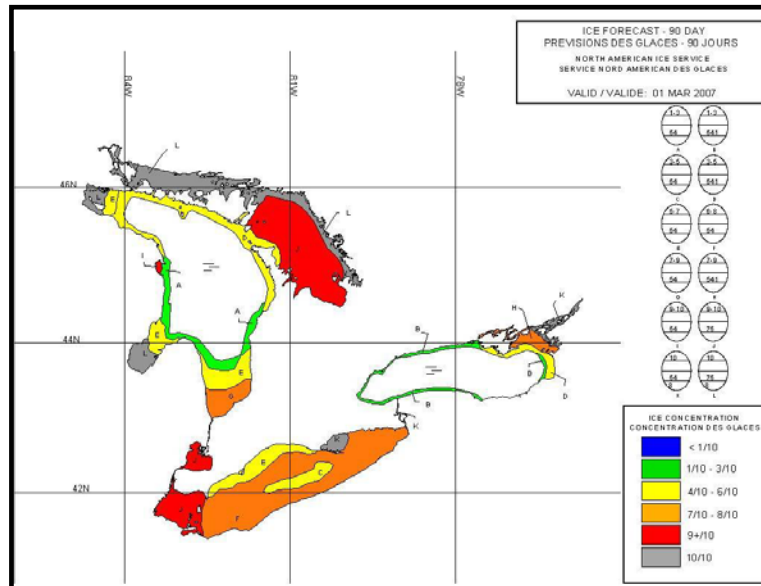


Figure 9: Expected ice Conditions - Eastern Great Lakes - 1 March 2007

Lake Superior

Water temperatures were generally near normal over the entire lake. Air temperatures will start off near normal during the first week of December but will average out to generally above normal over the entire lake during the month of December.

During the first half of December, generally open water to ice free conditions will prevail over all of the lake except for some areas of new lake ice in Black and northern Nipigon Bays during the first half of the month. During the third week of December, new with some thin lake ice will spread over the northern portion of Black Bay and the north-western portion of Nipigon Bay. Some new lake ice will also begin to form in north-eastern Thunder Bay. By the last week, some new and thin lake ice will begin to form around the Apostle Islands as well as in the St Mary's River. At the end of the month, all of Black and Nipigon Bays will be covered with medium and thin lake ice with some consolidated ice in the northern portions of the bays. Thunder Bay will have coastal thin and new lake ice with the central portion of the bay remaining mainly open water. Isolated patches of new lake ice will form in the Duluth area while the ice in the Apostle Islands will expand somewhat. Some new and thin lake ice will form in the smaller bays along the shore of Whitefish Bay. The remainder of Whitefish Bay will remain mainly open water. The St Mary's River will be entirely covered with thin and medium lake ice. Elsewhere over the lake, ice free conditions will prevail with a band of open water within 2 to 7 miles of the shore or ice edge. The ice conditions at the end of the month of December will be less than normal. The expected ice cover for January 1st is illustrated in Figure 4.

The seasonal temperature outlook for January and February indicates that temperatures will be generally above normal over Lake Superior. However periods of below normal temperature can be expected. Overall, ice growth will be somewhat slower than normal for this time of year. By the middle of January, both Black and Nipigon Bays will be consolidated with medium to thick lake ice. Ice in Thunder Bay will expand to cover most of the bay with thin and medium lake ice. Some consolidated ice will form in the north-western reaches of Thunder Bay as well as narrow bands elsewhere along the shore. From the entrance to Nipigon Bay to near Grand Marais, a narrow band of thin and new lake will form along the shore and extend about 1 to 4 miles from the shore. The southern shore of Lake Superior west of the Keweenaw Peninsula will begin to see new and thin lake ice form and expand about 3 to 7 miles from the shore by mid-January. Around the Apostle Islands, thin and new lake ice will spread out to cover the entire area while some consolidated ice will form around the southern islands and near the shore by mid-month. Along the southern shore east of the Keweenaw Peninsula to the entrance to Whitefish Bay, patches of new and thin lake ice will form but will not reach further than 1 to 4 miles from the shore. In Whitefish Bay, new and thin lake ice will grow and cover most of the bay by the 15th of January. Areas of consolidated medium and thick lake ice will develop in the small bays along the shore of Whitefish Bay. And finally, along the eastern shore from Whitefish Bay to Michipicoten Bay, patches of new and thin lake ice will appear but should not extend further than 1 to 3 miles from the shore. Elsewhere, ice free except open water within 5 to 15 miles of the shore or ice edge. Due to the milder than normal temperatures forecasts for the month of January, ice growth will continue to be limited. By the end of January, the northern third of Thunder Bay will be covered with consolidated thick lake ice while the rest of the bay will have a mix of medium and thick lake ice. Black and Nipigon Bays will continue to be consolidated with thick lake ice. A 5 to 15 miles wide band of mostly thin lake ice along the

shore will extend from about 15 miles east of Nipigon Bay to near Grand Marais. Along the southern shore of Lake Superior west of the Keweenaw Peninsula, the band of thin and some medium lake ice will extend to about 5 to 15 miles off-shore by the end of January. Consolidated medium lake ice will encase most of the Apostle Islands. East of the Keweenaw Peninsula to the entrance to Whitefish Bay, mainly new and thin lake ice will extend about 3 to 8 miles from the shore. In Whitefish Bay, mainly thin and medium lake ice will cover the bay with some consolidated medium lake ice along the shore. And from Whitefish Bay to Michipicoten Bay, mainly thin and new lake ice will extend no further than 3 to 8 miles from the shore. Elsewhere, ice free to open water within 5 to 15 miles of the coastline or ice edge. The expected ice cover for February 1st is illustrated in Figure 6.

The ice extent will continue to increase during the first half of February however at a slower than normal pace. By mid-February, the north-western coast of Lake Superior from Marathon to Duluth will be covered with a 6 to 18 mile wide band of thin and medium lake ice. Some new and thin lake ice growth will occur along the south-eastern shore of Isle Royale during the first two weeks of February. The southern shore of Lake Superior will be covered with mostly thin with some medium lake ice extending about 8 to 20 miles from the shore. The Apostle Islands will continue to be encased in consolidated thick lake ice. The area near Duluth will also be consolidated with medium to thick lake ice. Whitefish Bay will be covered with mostly medium and some thick lake ice. Mostly thin with some medium lake ice will remain within 10 and 20 miles from the shore between Whitefish Bay and Michipicoten Bay. The remainder of the lake will be mostly open water with ice free conditions in the east central portion of the lake. At the end of February, no significant change will occur in terms of ice extent. The area along the southern shore will have mostly thick lake ice occasionally under pressure due to on-shore winds. The expected ice cover for March 1st is illustrated in Figure 8.

With near to above normal temperatures forecast for the spring, the ice extent will most likely decrease during the first two weeks of March. Therefore clearing of Lake Superior will occur earlier than normal.

Lake Michigan

Water temperatures over Lake Michigan were near or slightly below normal over the entire lake near the end of November. During the first half of December, air temperatures will be below normal but overall temperatures for the month of December will be generally slightly above normal over the entire region.

At the end of November, no significant ice had begun to form however during the first week of December; isolated patches of new ice could form in the Little and Big Bay de Noc as well as the southern portion of Green Bay. At mid-December, there will not be any significant ice except in the Little and Big Bay de Noc as well as the southern portion of Green Bay where some isolated patches of new and thin lake ice could be present. During the last week of December, areas of new lake ice will spread to cover the Little and Big Bay de Noc as well as in southern Green Bay. Elsewhere, ice free conditions will prevail except open water near the shore and ice edge. The expected ice cover for January 1st is illustrated in Figure 4.

The seasonal temperature forecast indicates generally near to slightly above normal temperatures for the month of January and February. However periods of below normal

temperatures will also occur. During the first two weeks of January, some ice growth will occur in the northern portion of the lake as well as along the western and southern shores. By mid-month, areas of consolidated medium and thick lake ice will cover southern Green Bay as well as the Little and Big Bay the Noc. At the same time, the central and northern portion of Green Bay will be covered with mostly medium lake ice with some thick lake ice. Bands of new and thin lake ice will be present along the western and south-eastern shore and will extend about 2 to 7 miles from the shore. Just after New Years, some new lake ice will begin to form in the Straits of Mackinaw area and expand to cover most of the extreme north-eastern portion of Lake Michigan northeast of Beaver Island with thin lake ice by mid-January. By the end of the month, the southern half of Green Bay as well as the Little and Big bay the Noc will remain consolidated with thick lake ice however the north-central portion of the bay will remain mobile with a mix of medium and thick lake ice. The band of new and thin lake ice along the western and southern shore will extend 2 to 7 miles from the shore. The area of ice in the north-eastern portion of the lake will continue to progress south-westward and reach Beaver Island by the end of the month. Mostly medium and thick lake ice will cover the area with consolidated ice in the approaches to the Straits of Mackinaw. The remainder of the lake will be ice free to open water. The expected ice cover for February 1st is illustrated in Figure 6.

For the first half of February only slight changes are expected. By mid-February, most of Green Bay will be consolidated with thick lake ice except for the north-eastern entrance where the ice will remain mobile with medium and thick lake ice. The ice edge along the western and south-eastern shore will be patchy and located within 2 to 7 miles from the shore and be comprised of mostly medium and thin lake ice. The eastern shore of the lake will be covered with thin and medium lake ice which will extend about 1 to 4 miles from the shore. Meanwhile Grand Traverse Bay will be frozen over with thin lake ice. The north-eastern portion of Lake Michigan will be covered with thin and medium lake ice from about 5 to 10 miles southwest of Beaver Island north-eastward. Consolidated medium and thick lake ice will extend from the Straits of Mackinaw along the northern shore. By the end of the month, the coastal ice along the western, southern and eastern shore will melt during the last two weeks of February giving way to generally open water. As for the ice in extreme northern Lake Michigan, the ice edge will retreat north-eastward and be located near Beaver Island. Areas of consolidated thick lake ice will be present from the Straits of Mackinaw and extend about 15 to 20 miles from the straits. No change will occur to the consolidated ice in Green Bay as well as Little and Big Bay de Noc. The expected ice cover for March 1st is illustrated in Figure 8.

With generally near or above normal temperatures forecast for the month of March, ice melt will be faster than normal.

Lake Huron and Georgian Bay

Water temperatures near the end of November were generally near normal over the entire lake. Air temperatures will be below normal during the first week of December but overall temperatures will average near to slightly below normal over the entire lake during the month of December.

During the first half of December, mainly ice free conditions will prevail with open water within 2 to 5 miles of the shore. Some isolated patches of new ice could form in the North Channel as well as in Saginaw Bay. Some patches of new ice could form in the smaller bays

along the north-eastern shore of Georgian Bay. During the third week of December, some areas of new lake ice will begin to form along the shore of Saginaw Bay as well as in the North Channel and Georgian Bay. By the end of the month, most of the North Channel will be covered with thin lake ice with some isolated patches of consolidated medium and thick lake ice in the smaller bays of the channel. At the same time, Saginaw Bay will be covered with thin lake ice with some narrow bands of consolidated thin lake ice along the shore. The north-eastern shore of Georgian Bay will be covered with thin and medium lake ice with some consolidated ice in the smaller bays. The ice edge in Georgian Bay will be located about 5 to 10 miles from the shore. Elsewhere in the lake, mainly ice free except open water within 2 to 5 miles of the shore or ice edge. The expected ice cover for January 1st is illustrated in Figure 5.

The seasonal outlook for January and February will have generally near to below normal temperatures over the entire area. However occasional above normal temperatures can be expected during the period causing a slow down of ice formation or a decrease in ice coverage. During the first week of January, the entire North Channel will be covered with thin lake ice with the eastern and western section of the channel becoming consolidated with thick lake ice. The approaches to the Straits of Mackinaw will see the formation of new and thin lake ice during the same period. Meanwhile some sections of the coast will have narrow bands of new and thin lake ice within 1 to 3 miles of the shore. Saginaw Bay will continue to be covered with medium and thick lake ice with a significant portion of the bay covered with consolidated thick lake ice. By the middle of January, a significant portion of the North Channel will be covered with consolidated thick lake ice with the exception of the south-central part of the channel which should remain mobile with medium and thick lake ice. The approaches to the Straits of Mackinaw will continue to expand eastward and reach about 20 miles east of the straits, just beyond Bois Blanc Island. The entire Saginaw Bay area will be consolidated with thick lake ice. Along the entire length of the coastline of the lake, a band of thin and medium lake ice will extend about 3 to 12 miles from the shore. In Georgian Bay, the ice along the north-eastern shore will progress south-westward and cover the north-eastern third of the bay by mid-month with mostly thin lake ice. The small bays and inlets of the northeast shore will be frozen over with consolidated medium and thick lake ice. During the second half of January, all of the North Channel will be consolidated with thick lake ice. By the end of January, the medium lake ice in the north-western part of Lake Huron (eastern approaches to the Straits of Mackinaw) will be located about 5 to 10 miles east of Bois Blanc Island. Consolidated medium and thick lake ice will cover the straits and within 3 to 7 miles of the shore. The coastal region will have a band of thin and medium lake ice extending about 7 to 20 miles from the shore. No change to the consolidated thick lake ice in Saginaw Bay. The southern portion of the lake will witness the greatest ice edge extension. The ice edge will be located about 20 to 30 miles from the southern shore. Meanwhile in Georgian Bay, the south-westward progression of the ice edge will have the northern two-thirds of the bay covered with thin and medium lake ice by the end of the month. The south-western shore of the bay will also have a narrow band of new and thin lake ice. The rest of the lake and the southern portion of Georgian Bay will be mainly open water. The expected ice cover for February 1st is illustrated in Figure 7.

During the first half of February, the north-western portion of the lake east of the entrance to the Straits of Mackinaw will be covered with thin and medium lake ice while the entrance to the straits will have an expanse of consolidated medium and thick lake ice. The coastal area of the lake will continue to have a band of thin and medium lake ice 7 to 20 miles wide. The southern portion of the lake will be covered with thin and medium lake ice. Most of

Georgian Bay will be covered with medium and thick lake ice while the south-western portion of the bay will have open water or new and thin lake ice. By the end of February, little change will occur compared to the ice situation at mid-month. The expected ice cover for March 1st is illustrated in Figure 9.

With generally near to slightly below normal temperatures during the month of March, clearing of Lake Huron and area will occur close to normal rate.

Lake Erie and Lake St Clair

The water temperatures ranged from near normal in the eastern part of the lake to about 1°C below normal in the west as well as in Lake St Clair during the latter part of November. Air temperatures will average below normal during the first half of December but will moderate to near or slightly below normal over the entire lake for the rest of the month of December.

During the first half of December, generally open water to ice free conditions will prevail over Lake St Clair and Lake Erie except for some new lake ice that could form along the coastal area of the Western Basin as well as in Lake St Clair. During the third week of December, new lake ice will continue to form in the south-eastern portion of Lake St Clair and spread to cover most of the lake by month's end. The patches of new ice along the coastal area of the Western Basin will continue to form during the third week of December and expand to cover the entire basin by the end of the December. Some new ice will begin to form in Long Point Bay. Some ice will drift out of the Western Basin along the shores. The remainder of Lake Erie will be open water. The expected ice cover for January 1st is illustrated in Figure 5.

The forecast temperatures over Lake Erie will be near to slightly below normal for January and February. However periods of above normal temperatures will occur causing a slowdown in ice formation or a decrease in ice coverage. During the first half of January, the ice outside of the Western Basin will expand from the northern and southern shore of the lake. By mid-January, portion of Lake St Clair will be consolidated with medium while the remainder of the lake will remain covered with thin and medium lake ice. The northern portion of Lake Erie as well as a narrow band of ice along the southern shore will be covered with thin and medium lake ice while the eastern and central portion of the lake will remain open water. The Western Basin will have medium lake ice over the entire area. By the end of the month most of the lake will be covered with medium lake ice with looser conditions in the eastern portion of the lake. Some areas of consolidated ice will begin to form along the shore of the Western Basin as well as all of Lake St Clair. The expected ice cover for February 1st is illustrated in Figure 7.

During the first half of February, the ice coverage in Lake Erie will not change significantly however occasional storms will cause some ice destruction and lead development. The thickest ice will be located in the eastern and southern portions of the lake as well as the Western Basin. Lake St Clair will remain consolidated with thick lake ice. By the end of February, some signs of break-up will appear mostly along the northern and western portion of the lake. Most of the ice will have reached the thick lake ice stage except

for the area along the northern shore which will have some areas of thin and new lake ice. The expected ice cover for March 1st is illustrated in Figure 9.

With generally near to below normal temperatures for March, ice melt will be somewhat slower than normal.

Lake Ontario

Water temperatures varied from near normal over the western and central portion of the lake and up to 1.0°C above normal in the eastern section near the end of November. Temperatures over Lake Ontario during the month of December will be generally near to below normal.

During the first half of December, ice free conditions will prevail over the entire area. However some new lake ice could form in the Bay of Quinte during the second week. Late in the third or during the last week of December some patches of new and thin lake ice will form in St Lawrence River. By the end of the month the Bay of Quinte will become consolidated with thin lake ice. Some areas of thin and new lake ice will form along the eastern shore of Lake Ontario. The expected ice cover for January 1st is illustrated in Figure 5.

The temperature forecast for January and February will be generally near to below normal. However some periods of above normal temperatures can be expected during these two months causing some ice melt or destruction. During the first week of January ice will spread south-westward from the entrance to the St Lawrence River and extend about 3 to 8 miles from the shore. The ice will mostly be thin and new. New lake ice will begin to form in the bays along the Prince Edward county shore. By mid-January some isolated narrow bands of new and thin lake ice will form along the northern and southern shore. At the same time, the entire north-eastern section of the lake will be covered with thin lake ice. The entrance to the St Lawrence River will be mostly consolidated with thin and medium lake ice with areas of mobile thin and medium lake ice. The rest of the lake will remain ice free with open water conditions prevailing within 3 to 6 miles of the shore or ice edge. During the third week of January, all of the St Lawrence River will be consolidated with medium lake ice. By the end of the month, the ice edge in the north-eastern part of the lake will extend 10 to 25 miles from the shore while elsewhere the ice edge will be 2 to 5 miles from the Lake Ontario shore. Ice thickness will vary from medium and thin in the eastern section of the lake and around Prince Edward County Peninsula to new and thin elsewhere along the shore. The central portion of the lake will be ice free with open water conditions within 2 to 5 miles of the ice edge and shore. The expected ice cover for February 1st is illustrated in Figure 7.

During the first half of February, the ice extent will remain stable over most of the lake. By mid-month, the eastern section of the lake between Prince Edward County and the eastern shore of the lake will be covered with thin and medium lake ice. Consolidated medium lake ice will encase the small bays along the north-eastern shores as well as along the shore of Prince Edward County Peninsula. The St Lawrence River will continue to be covered with consolidated medium to thick lake ice. Elsewhere along the coast, patches of thin and new lake ice will prevail within 2 to 5 miles of the shore. The west-central portion of the lake will remain ice free with open water within 2 to 5 miles of the shore or ice edge. By the end of February, the ice edge will retreat north-eastward in the eastern section of the lake while the narrow bands of thin

and new ice elsewhere along the shore of Lake Ontario will melt. Ice thickness will be mostly medium and thick lake ice in the north-eastern portion of the lake. The expected ice cover for March 1st is illustrated in Figure 9.

With generally below normal temperatures during the month of March, ice melt will be somewhat slower than normal during the spring.

Appendix

Appendix A - Stages of Development of Lake Ice

For more information on this section, please refer to the following web link on the Canadian Ice Service web site:

<http://ice-glaces.ec.gc.ca/App/WsvPageDsp.cfm?ID=11040&LnId=78&Lang=eng>

Appendix B - General information from the Canadian Coast Guard

General information regarding transmission times for bulletins and charts from various radio broadcast stations:

http://www.ccg-gcc.gc.ca/mcts-sctm/ramn/docs/index_e.htm

Appendix C - WMO (World Meteorological Organization) Colour Code

Information regarding the ice chart colour code using the WMO standard.

<http://ice-glaces.ec.gc.ca/App/WsvPageDsp.cfm?ID=11500&LnId=19&Lang=eng>

Appendix D - Ice Services for Canadian Great Lakes Waters

In Canada, ice services are provided to shipping, fishing and in-lake operators by a co-operative effort of Environment Canada and the Department of Fisheries and Oceans. Department of Fisheries and Oceans, through the Canadian Coast Guard, provides icebreaker services and operates a seasonal Ice Operations Office at Sarnia. Canadian Ice Service of the Atmospheric Environment Service (division of Environment Canada) is responsible for gathering and generating ice information services and forecasts.

The following forecasts are issued:

Great Lakes Ice Hazard Bulletin (FICN19): A general ice description of conditions in each of the Great Lakes and, if required, a warning of hazardous ice conditions for the next 36 hours.

Twice-a-week Ice Analysis Charts and Regional Ice Chart covering a larger area are issued by the North American Ice Service. The Great Lakes Ice Analysis Charts are issued in two sections: the western portion of the Great Lakes which includes Lake Superior and Lake Michigan and the eastern portion of the Great Lakes which includes Lake Huron, Lake St Clair, Lake Erie and Lake Ontario. In addition to the distribution outlined in Appendix B, ice forecasts and bulletins and the Seasonal Outlook are available from the Canadian Ice Service website (<http://ice-glaces.ec.gc.ca>) and the National Ice Center website (<http://www.natice.noaa.gov/products/gl-ches/index.htm>). The seasonal outlook is issued once yearly then updated twice monthly by 30-day forecasts.

For further information concerning these services please contact Canadian Ice Service by phone (613) 996-1550, facsimile (613) 947-9160 or e-mail at: cis-scq.client@ec.gc.ca.

or

National Ice Center by phone (301) 394-3100, facsimile (301) 394-3200 or e-mail at: liaison@natice.noaa.gov