

**Produced by Canadian Ice Service of
Environment Canada
1 December 2006**

**Seasonal Outlook
Gulf of St. Lawrence and
East Newfoundland Waters
Winter 2006-2007**





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GULF OF ST. LAWRENCE AND NEWFOUNDLAND WATERS

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

The temperature profile since late spring to the end of October over the Atlantic Provinces ranged from near normal over the western part of the Gulf of St Lawrence and increased to above normal values over Newfoundland and most of the Labrador region. For the month of November, temperatures were much above normal over the entire region.

At the end of November, generally open water conditions prevailed in Lake Melville except for a small patch of new and grey ice in the western end of the lake. Some new ice has begun to form in the smaller bays along the northern Labrador coast.

The forecast for December is for near to slightly above normal air temperatures for the Gulf of St. Lawrence, Newfoundland and the southern Labrador coast. The northern portion of Labrador will be under the influence of near to below normal temperatures. Freeze-up over the St. Lawrence River and northern Labrador coast will occur slightly earlier than normal while the Gulf of St Lawrence, Newfoundland and southern Labrador will occur later than normal.

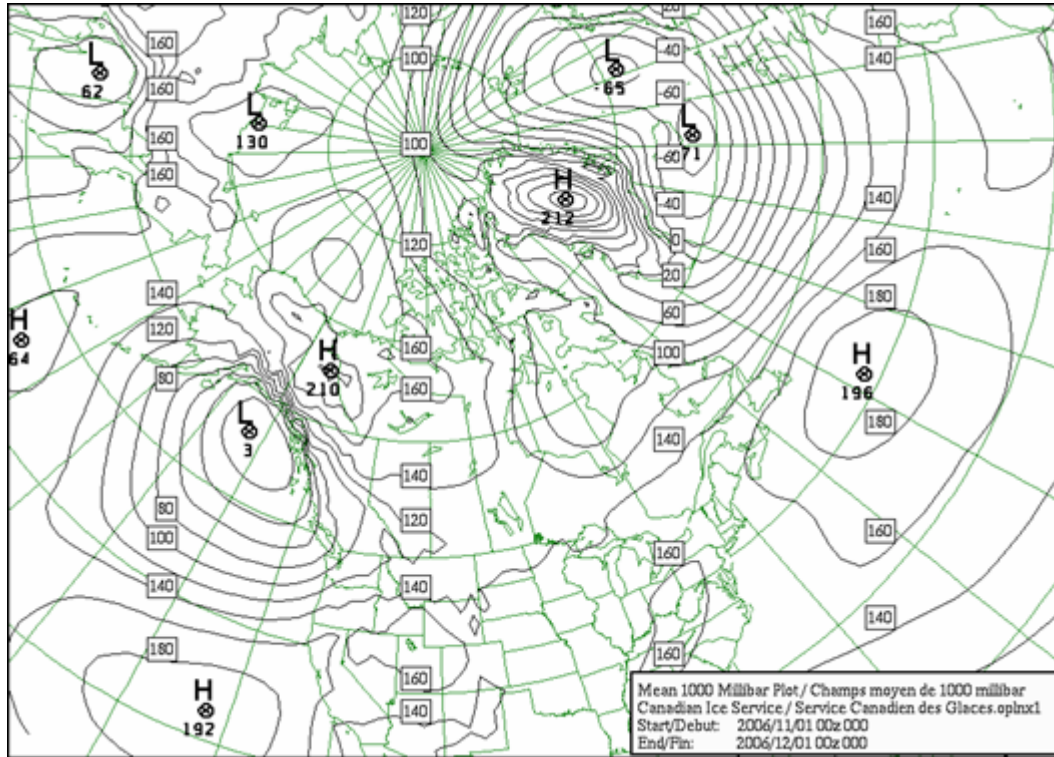


Figure 1: 1000 mb pressure pattern - November 2006

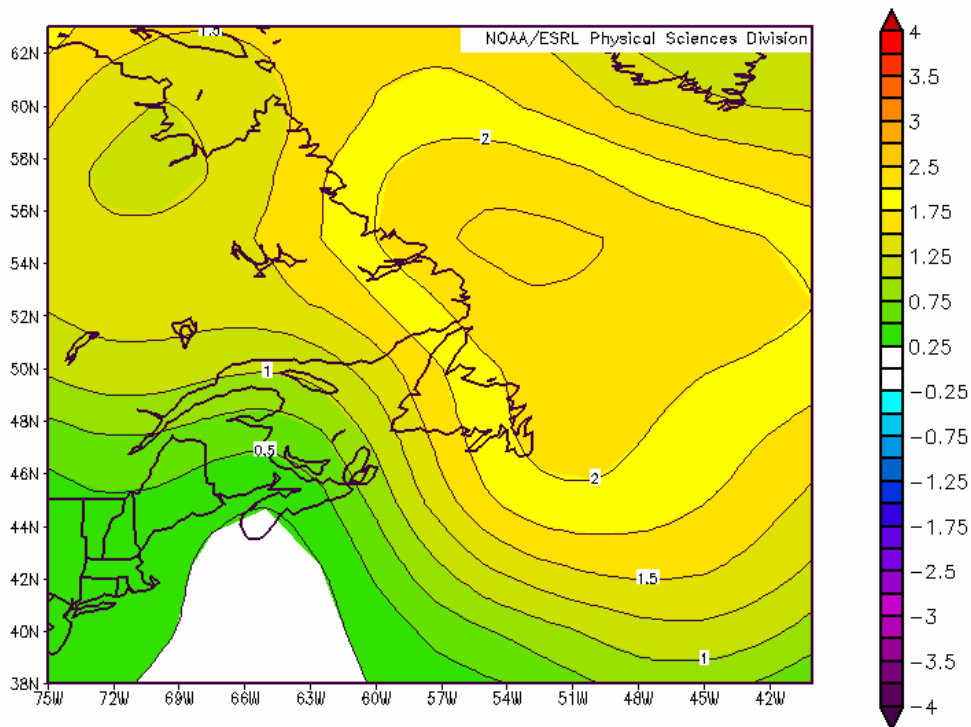


Figure 2: Departure from normal temperatures – June 1, 2006 to October 31, 2006



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	Normal Temperatures	Observed	Departure
Quebec	-0.7	2.9	3.6
Sept-Iles	-3.0	0.7	3.7
Gaspé	-0.7	2.6	3.3
Sydney	3.2	5.5	2.3
Stephenville	2.2	4.5	2.3
St Johns	2.5	5.0	2.5
Gander	0.8	3.6	2.8
Cartwright	-2.5	-0.7	1.8
Goose Bay	-4.6	-1.9	2.7
Nain	-5.2	-2.7	2.5
Average	-0.8	2.0	2.8

Table 1: Departure from Normal Temperatures - November 2006

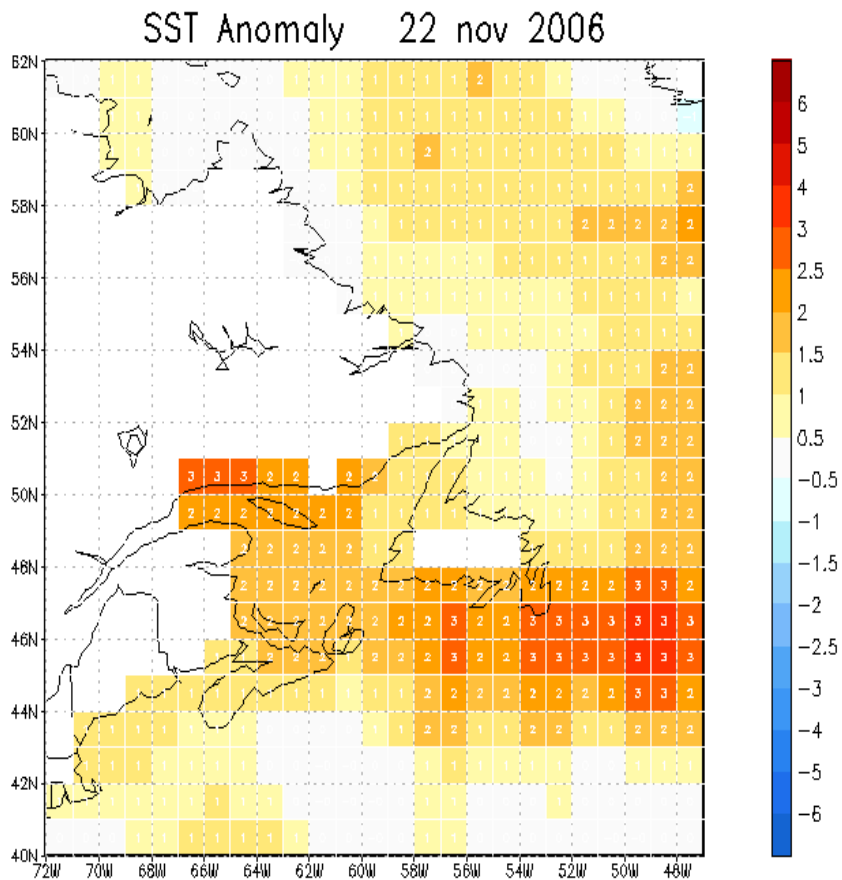


Figure 3: Water temperature anomalies - 22 November 2006 (NCEP)



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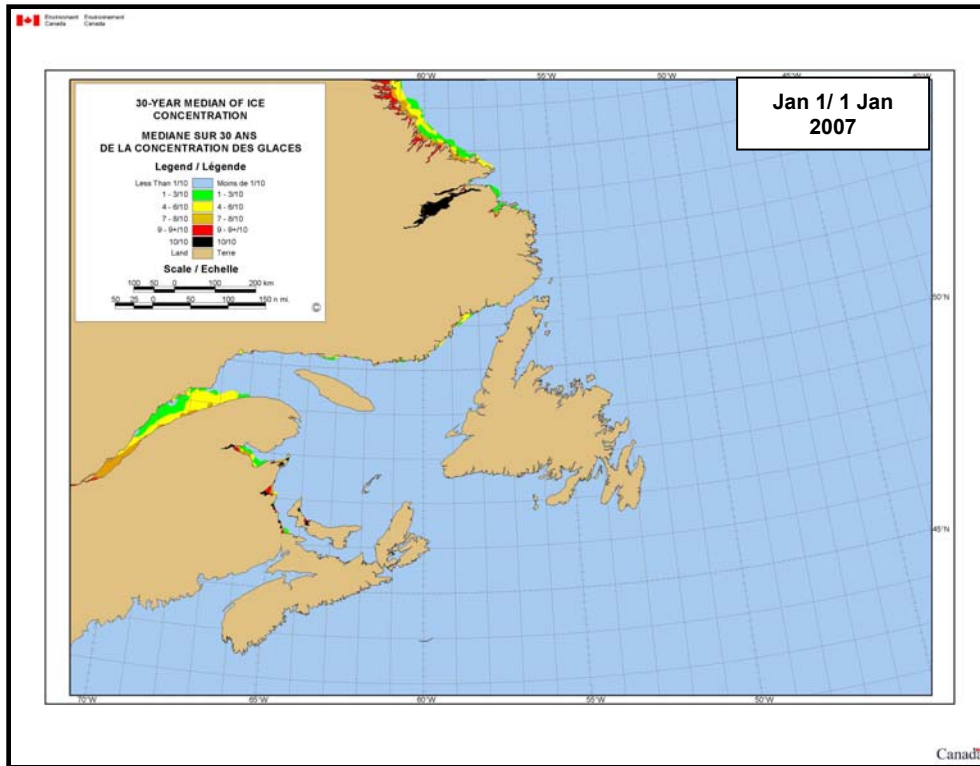


Figure 4: Expected ice conditions – 1 January 2007

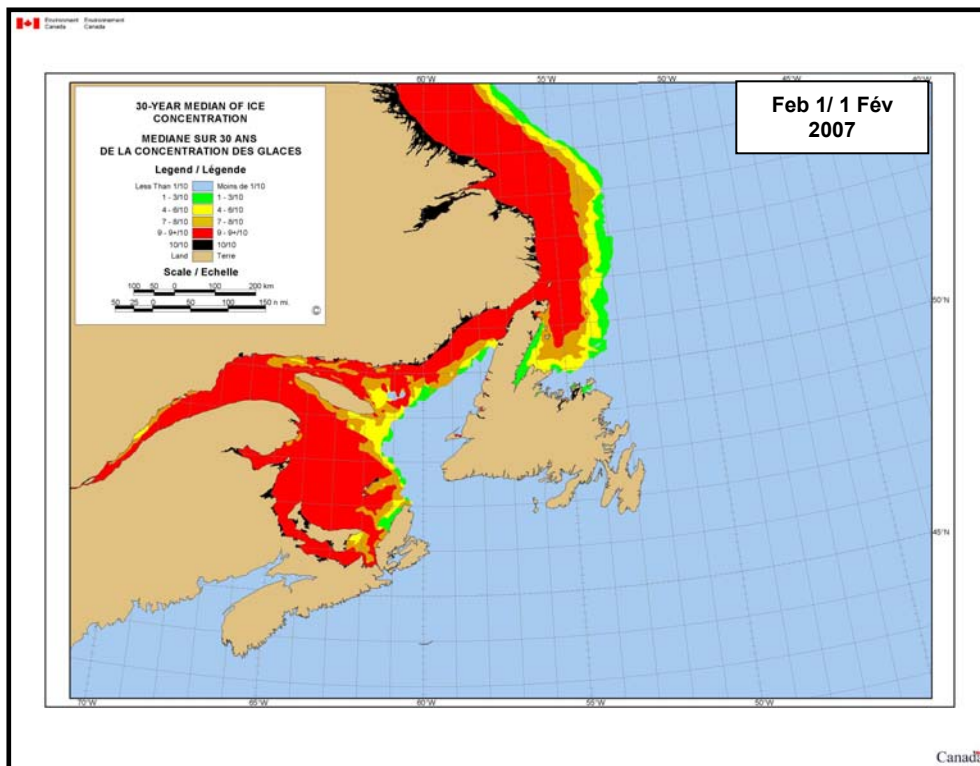


Figure 5: Expected ice conditions – 1 February 2007

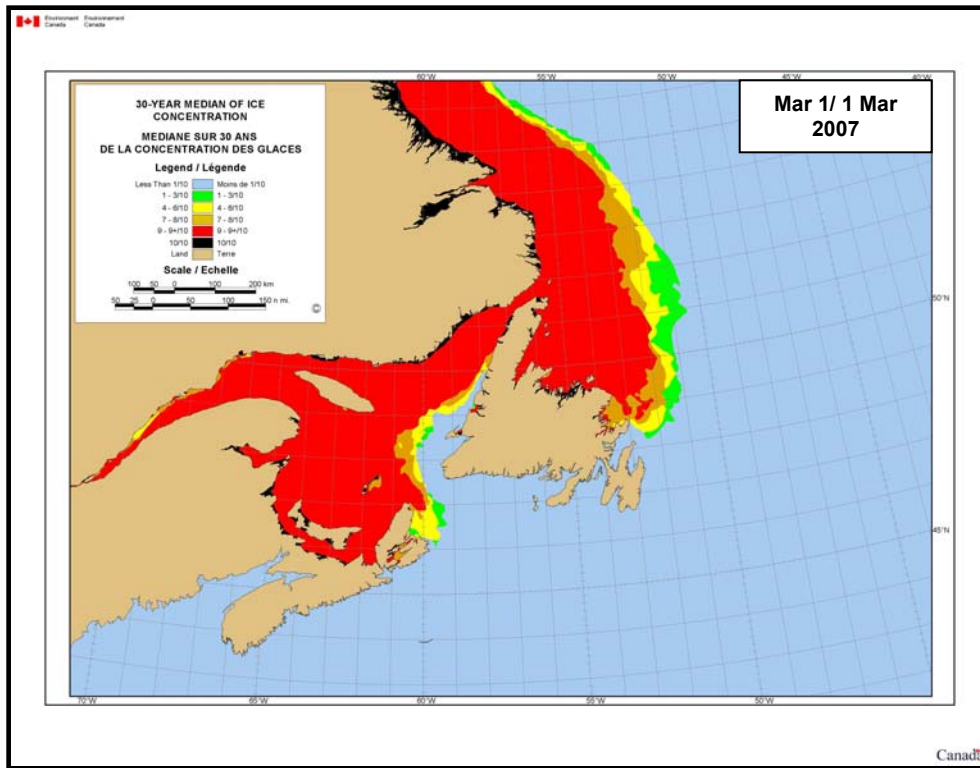


Figure 6: Expected ice Conditions – 1 March 2007



Gulf of St. Lawrence

Water temperatures ranged from around 3.0°C above normal over the north-western part of the Gulf of St Lawrence and the Estuary to 1.0°C to 1.5°C above normal in the Northeast Arm. During the first week of December, temperatures will be slightly below normal however for the balance of the month temperatures will be near to slightly above normal.

At the beginning of December, no new ice has begun to form over the St Lawrence River. New ice will begin to form around the Quebec City area near the end of the second or during the third week of December, and will continue to expand eastward down the river. During the last week of December, some new and grey ice will begin to form in the bays of the New Brunswick and Prince Edward Island coast. During the latter part of the third week into the fourth week, the North Shore of Quebec will also see some patches of new ice form in the bays. By the end of December the northern ice edge in the Estuary will reach Pointe des Monts while the southern edge will stretch along the north shore of the Gaspé Peninsula and be located about 30 miles east of Cap Chat. The rest of the Gulf will remain open water to ice free. The forecast ice extent for January 1st is illustrated in Figure 4.

The seasonal temperature outlook for January and February indicates that temperatures will be above normal over most of the Gulf of St Lawrence. The exception will be in the St Lawrence River and Estuary as well as the western part of the Gulf where temperatures will be near to slightly below normal. Significant fluctuations in temperature will likely occur over the Gulf as storms track eastward over the area. With generally above normal temperatures over the Gulf, ice extent will be somewhat less than normal. Ice thickness will also be slightly less than normal over most of the Gulf. The exception will be the slightly thicker than normal ice located in the Estuary and the St Lawrence River. The ice will continue to form and drift eastward from the river into the Estuary during the first half of January. By the middle of January, most of the Estuary as well as the Gaspé Passage will be frozen over with new and grey ice with a narrow band of greywhite ice drifting along the Gaspé Peninsula. The ice edge will extend offshore by about 5 to 10 miles from the northern shore of Prince Edward Island. The new and grey ice along the North Shore will continue to spread southward to about 7 to 20 miles. At the same time, new ice will begin to form in the Belle Isle Strait during the second week of the month. By the end of January the ice edge will be located 20 to 30 miles southeast of Anticosti Island. The ice offshore from the New Brunswick and Prince Edward Island coasts will spread eastward to reach just east of the Magdalen Islands by month's end. The ice will be near Cape North on Cape Breton Island with some ice moving into Northwestern Cabot Strait. Mainly greywhite with some thin first year ice will be present in Northumberland Strait and along the northern shore of Prince Edward Island. There will also be some areas of thin first year ice along the south side of the Estuary and in southern Chaleur Bay. The ice edge from the Northeast Arm area will expand southward to about 30 miles north of Daniel's Harbour. A few patches of new and grey ice will form south of the ice edge along the western Newfoundland coast. The ice extend from the North Shore will be located about 45 to 60 miles south. The remainder of the Gulf will be open water to ice free. Generally speaking the ice edge will be



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located slightly north and west of its normal position for the end of January. The forecast ice extent for February 1st is illustrated in Figure 5.

The ice pack will continue to expand south-eastward in the gulf during the first half of February. Ice will drift from the gulf into the western third of Cabot Strait. Meanwhile, the ice in the Northeast Arm will continue to edge southward along the western Newfoundland Coast and will be located about 30 miles south of Daniel's Harbour by mid-month. South of the ice edge, the smaller bays and inlets along the western Newfoundland Coast will have some new and grey ice. At the same time, the ice along the North Shore will continue to expand southward. By mid-February, the ice edge will be about 60 to 75 miles from the North Shore of Quebec and about 20 to 40 miles east of the Magdalen Islands. Most of the gulf will be covered with grey ice with mostly greywhite and thin first year ice located in the south-western part of the gulf, in southern Chaleur Bay and along the north shore of the Gaspé Peninsula. Some of the thicker ice will drift south from Cape North and could reach the Sydney area. The rest of the gulf from the eastern side of Cabot Strait into the south-eastern part of the Gulf will be open water. By the end of February, the western two thirds of the Chabot Strait will be cover with ice. Ice will continue to move down the west coast of Newfoundland and will be located near the Bay of Islands by that time. Open water conditions will persist in the eastern third of Cabot Strait and along the west coast of Newfoundland south of the ice edge except for some new and grey ice in the sheltered bays and inlets. During the month of February near normal ice conditions in terms of extend and thickness can be expected in the northern St. Lawrence River and along the east New Brunswick Coast while the rest of the Gulf will have less than normal ice extent and thickness. The forecast ice extent for March 1st is illustrated in Figure 6. The ice will reach its maximum extent just after mid-March.

With generally near to above normal temperatures forecast for the spring over most of the gulf, clearing of the St. Lawrence River and Estuary and western Cabot Strait will occur slightly earlier than normal.



East Newfoundland Waters

Water temperatures over the east Newfoundland waters ranged from about 1°C above normal near and north of Notre Dame Bay to about 3°C above normal east of the Avalon Peninsula. As for Labrador coast area, water temperatures were near normal in the near shore area and increased to 1 to 1.5°C above normal about 120 to 240 miles from the coast (see Figure 3).

At the end of November, no appreciable amount of ice was observed in Lake Melville except for some ice drifting out of the Churchill River. Some patchy new ice has begun to form in the smaller bays along the northern portion of the Labrador coast. Elsewhere mainly open or bergy water prevailed. The ice edge was well north of Cape Chidley which is 3 weeks later than normal. Air temperatures will be above normal for Newfoundland and southern Labrador for the month of December however the northern portion of the Labrador coast will be near to below normal. In Lake Melville, ice will continue to grow and cover the entire lake during the second week of December. By the middle of the month, mostly greywhite will cover Lake Melville. New and grey ice will continue to form along the northern Labrador coast and will spread southward to reach Nain during the third week. All of Lake Melville will be consolidated with thin first year ice at that time. By the end of the December, the ice edge will be just north of Groswater Bay. South of the ice edge, some new ice will form in the smaller bays and inlets. No significant ice will begin to form along the Newfoundland coast before the New Year. The expected ice cover for January 1st is illustrated in Figure 4.

The seasonal temperature forecast indicates near to above normal temperatures over most of the area during January and February except over Northern Labrador where temperatures will be near to below normal. However, temperatures will fluctuate between above and below normal values over Newfoundland as storms track eastward over the area. This, combine with a later than normal freeze-up, will result in the ice extent and thickness to be slightly less than normal at the end of January. During the second week of January, some new and grey ice will begin to form along the Newfoundland coast north of Cape Bonavista including the eastern shore of the Northern Peninsula. The southern ice edge will move southward to lie just south of Belle Isle Strait by the middle January. The ice in the Bay of Exploits will become consolidated during the third week of January. By the end of January, the southern edge of the main ice pack will be north of Notre Dame Bay. Looser new and grey ice will be present along the shore of Notre Dame Bay. The seaward extend of the ice will be about 90 to 120 miles east of the Labrador coast and the Northern Peninsula. The ice type from Belle Isle Strait southward will be grey and new with some greywhite while the ice between Belle Isle Strait to Cartwright will be mostly greywhite and thin first year ice. North of Cartwright, mostly thin with some medium first year ice will prevail. The expected ice cover for February 1st is illustrated in Figure 5.

In February, the ice edge will continue its southward progression and will fill Notre Dame Bay by the end of the first week of February. By the middle of February the southern ice edge will be near Cape Bonavista. Some patches of new and grey ice will form in the



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smaller bays and inlets south of Cape Bonavista. By the end of the month the ice edge will be slightly south of the mid-month position. Figure 6 shows the expected ice conditions on March 1st. At that time, greywhite and thin first year ice will be the dominate ice in the pack south of Belle Isle Strait. North of Belle Isle Strait, thin first year with some medium first year ice will prevail. The eastern ice edge will be located about 120 to 180 miles east of the Northern Peninsula and east of the Labrador coast at the end of February.

During the month of March the southern ice edge could edge further south to about Cape St Francis however the significant ice will be located from Bonavista Bay northward. The ice edge will begin to retreat during the latter part of March.

Concentrations of old ice in northwestern Baffin Bay where slightly less than normal and small amounts of this old ice will be dispersed in the southern pack during the spring season. Note that ice concentration, ice type, and ice pressure in coastal areas will vary according to winds associated with storm systems passing over Newfoundland waters. The southern ice edge is expected to retreat at a near normal pace in the spring.



Appendix

Appendix A - Stages of Development of Sea 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=11170&LnId=29&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 East Coast Waters

In Canada, ice services are provided to shipping, fishing and offshore operators by a co-operative effort of Environment Canada and Department of Fisheries and Oceans. Department of Fisheries and Oceans, through the Canadian Coast Guard, provides icebreaker services and operates seasonal Ice Operations Offices at Dartmouth, St. John's and Quebec City. 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:

1. Gulf of St. Lawrence Ice Hazard Bulletin (FICN17): A tactical ice bulletin with an ice edge delimiter and, if required, a warning of hazardous ice conditions for the next 36 hours. This Ice Hazard Bulletin briefly describes general ice conditions within each marine forecast area.
2. East Newfoundland Waters Ice Hazard Bulletin (FICN18): A tactical ice bulletin with an ice edge delimiter and, if required, a warning of current hazardous ice conditions for the next 36 hours. This Ice Hazard Bulletin briefly describes general ice conditions within each marine forecast area.



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3. Iceberg Bulletin (FICN10): a narrative providing information on the distribution of icebergs in East Newfoundland waters and along the Labrador Coast. During the navigation season emphasis is placed on the Strait of Belle Isle and approaches.

Ice bulletins on ice conditions in the St. Lawrence River below Montreal are prepared twice daily (SRCN01 and SRCN03) by the ice office in Quebec City.

Daily ice analysis charts and a weekly "Regional Ice Chart" covering a larger area are issued by Canadian Ice Service. 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>). 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

Canadian Coast Guard Ice Operation Offices provide ship routing advice and arrange for icebreaker support when available and necessary. In order to obtain maximum benefit from Ice Operation Offices, it is essential that Masters report to 'ECAREG CANADA' office before entering ice covered waters.