

# CANADA SEA ICE

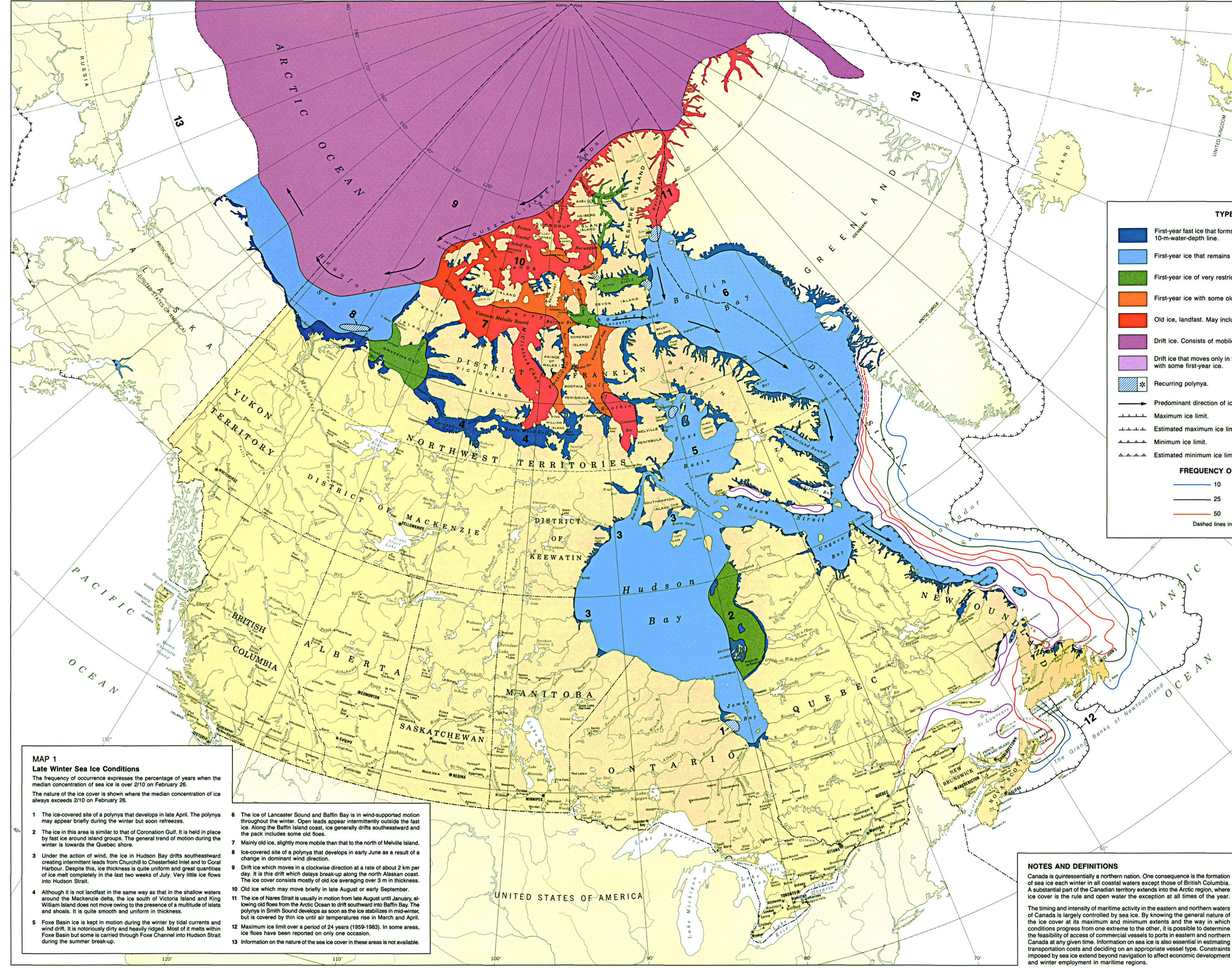
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Scale 1:10 000 000 or 1 centimetre represents 100 kilometres  
 Échelle 1:10 000 000 ou 1 centimètre représente 100 kilomètres  
 Lambert Conformal Conic Projection, Transverse Mercator at 60°W and 60°E  
 Modified Polyconic Projection, North of Latitude 66° 30'N



**MAP 1**  
**Late Winter Sea Ice Conditions**  
 The frequency of occurrence expresses the percentage of years when the median concentration of sea ice is over 20% on February 20. The nature of the ice cover is shown where the median concentration of ice always exceeds 20% on February 20.

- The ice-covered site of a polynya that develops in late April. The polynya may appear briefly during the winter but soon refreezes.
- The ice in this area is similar to that of Convoy Bay. It is held in place by fast ice around island groups. The general trend of motion during the winter is towards the Convoy Bay.
- Under the action of wind, the ice in Hudson Bay drifts southward creating narrow leads from Churchill to Chesterfield Inlet and the Gulf Harbour. Despite this, ice thickness is quite uniform and great quantities of ice melt out in the last few weeks of July. Very little ice ever enters Hudson Strait.
- Although it is not true that the ice in the shallow waters around the Mackenzie delta, the ice south of Victoria Island and King Island is held in motion during the winter by fast currents and wind drift, it is not true that it is held in motion during the winter by fast currents and wind drift. Most of it melts when spring break-up begins in late April.
- Information on the nature of the sea ice cover in these areas is not available.
- The ice of Lancaster Sound and Baffin Bay is in wind-sustained motion throughout the winter. Open leads appear intermittently outside the fast ice along the Baffin Island coast. Ice generally drifts southward and the southward drift is more rapid.
- Mainly old ice, slightly more mobile than that to the north of Melville Island.
- Ice-covered site of a polynya that develops in early June as a result of a change in dominant wind direction.
- Drift ice which moves in a clockwise direction at a rate of about 2 km per day. It is the drift which opens break-up along the north coast of the ice cover.
- The ice of Healy Strait is usually in motion from late August until January, as indicated by the arrows. The ice of Healy Strait is usually in motion from late August until January, as indicated by the arrows.
- Maximum ice limit over a period of 24 years (1959-1983). In some areas, ice has been reported on only one occasion.
- Information on the nature of the sea ice cover in these areas is not available.

**TYPES OF SEA ICE**

- First-year fast ice that forms during early winter and usually spreads to the 10-m-water-depth line.
- First-year ice that remains mobile, moving in response to wind and currents.
- First-year ice of very restricted motion.
- First-year ice with some old floes intermingled, usually 25% or less.
- Old ice, landfast. May include up to 20% first-year ice.
- Drift ice. Consists of mobile old ice; may include some first-year ice.
- Drift ice that moves only in the latter part of warm summers. Consists of old ice with some first-year ice.
- Recurring polynya.
- Predominant direction of ice drift.
- Maximum ice limit.
- Estimated maximum ice limit.
- Minimum ice limit.
- Estimated minimum ice limit.

**FREQUENCY OF ICE OCCURRENCE (%)**

- 10
- 25
- 50
- 75
- 90

Dashed line indicates estimated information

**NOTES AND DEFINITIONS**

Canada is geographically a northern nation. One consequence is the formation of sea ice each winter in all coastal waters except those of British Columbia. A substantial part of the Canadian territory extends into the Arctic region, where ice cover is the rule and open water the exception at all times of the year.

The timing and intensity of weather activity in the western and northern waters of Canada is largely controlled by sea ice. The amount of the general nature of the ice cover at its maximum, the physical extent and the way in which conditions progress from one extreme to the other. It is possible to determine the feasibility of access of commercial vessels to ports in northern and eastern Canada at any given time. Information on sea ice is also essential in estimating transportation costs and in making an appropriate vessel type. Considerable support for sea ice extent beyond navigation to affect economic development and some employment in northern regions.

Maps 1 and 2 depict the occurrence of sea ice when the ice cover is at its maximum extent (late February and minimum extent (late August). The maps also provide information on ice types, conditions and motion for specific polynyas.

Maps 3 and 4 show the retreat and advance of the sea ice cover. Median break-up and freeze-up dates are indicated for the area where the frequency of occurrence of sea ice is at least 25% on February 20. Although weather conditions may cause break-up and freeze-up to the date significantly earlier or later in certain years, in that of the years the change will occur during the time period shown.

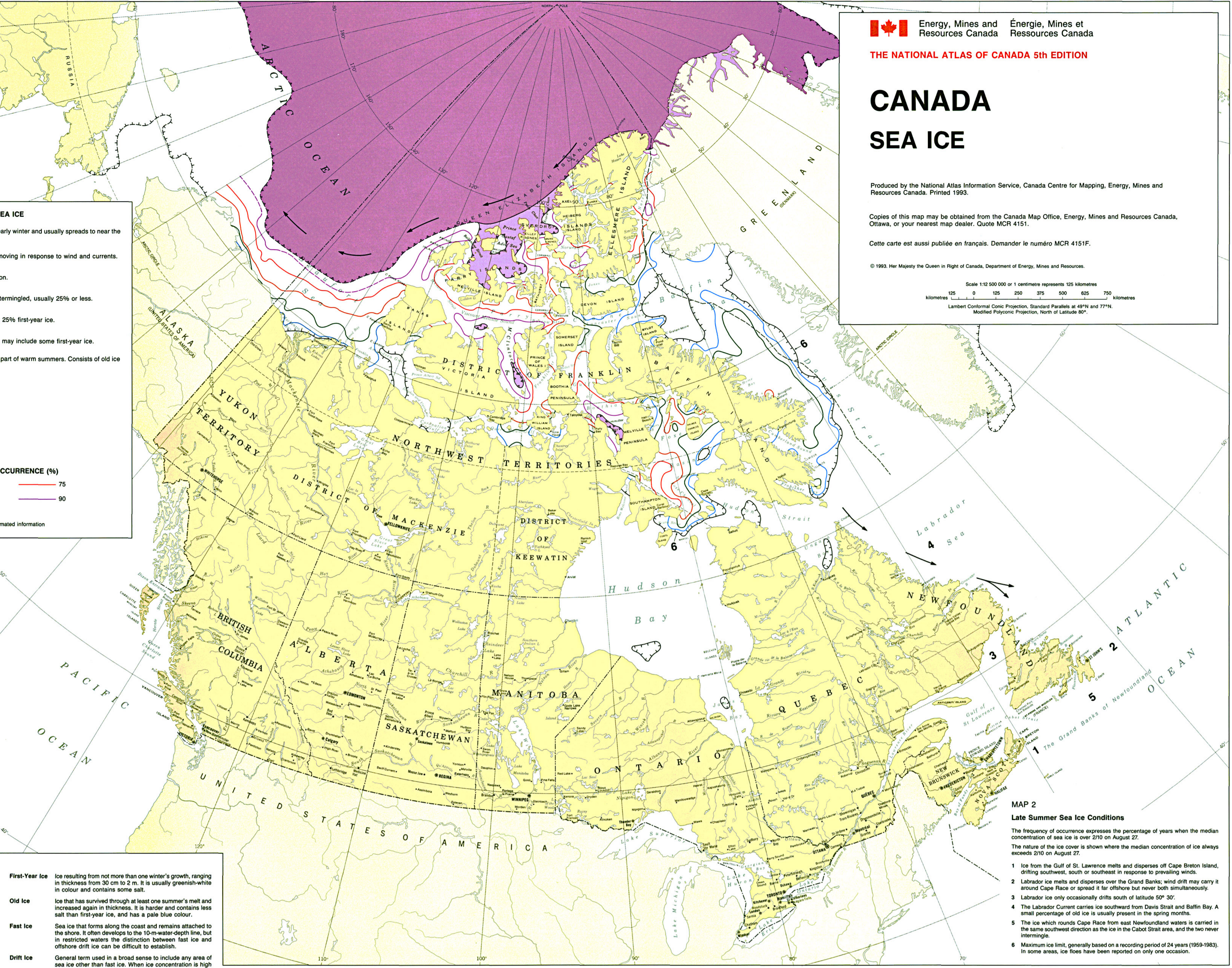
For the sea cover, frequency of occurrence of sea ice has been defined as the percentage of years when the median ice concentration is over 20% on the day for the 24 years of record used. A concentration of 20% which corresponds to what is known as "very open ice" (traditionally described as ice with a concentration ranging from 10 to 20%), was chosen because most commercial vessels can navigate with little difficulty in such water. At higher concentrations, ice strength, vessels, careful navigation and ice-carrying support are required.

For over thirty years, Environment Canada has been collecting ice data by aircraft and satellite, as well as by ship- and ship-based means. The information provided for Canada and adjacent waters was derived from the Department of Fisheries, which consist of weekly reports of ice type and amount at nearly 2,000 points across the country (550 points in Arctic waters and 1,500 points south of latitude 60°N). This information spans the period from 1959 to 1992. Additional data on ice limits during break-up and freeze-up were collected during the most recent Canadian Arctic Survey (1989-1992). The most complete Arctic Survey, however, is the 1959-1960 survey. The data from this survey are not included in this map. The most complete Canadian Arctic Survey, however, is the 1959-1960 survey. The data from this survey are not included in this map.

**Sea ice**  
 Any form of ice found at sea that has originated from the freezing of sea water. It does not include lake ice, river ice or glacier ice.

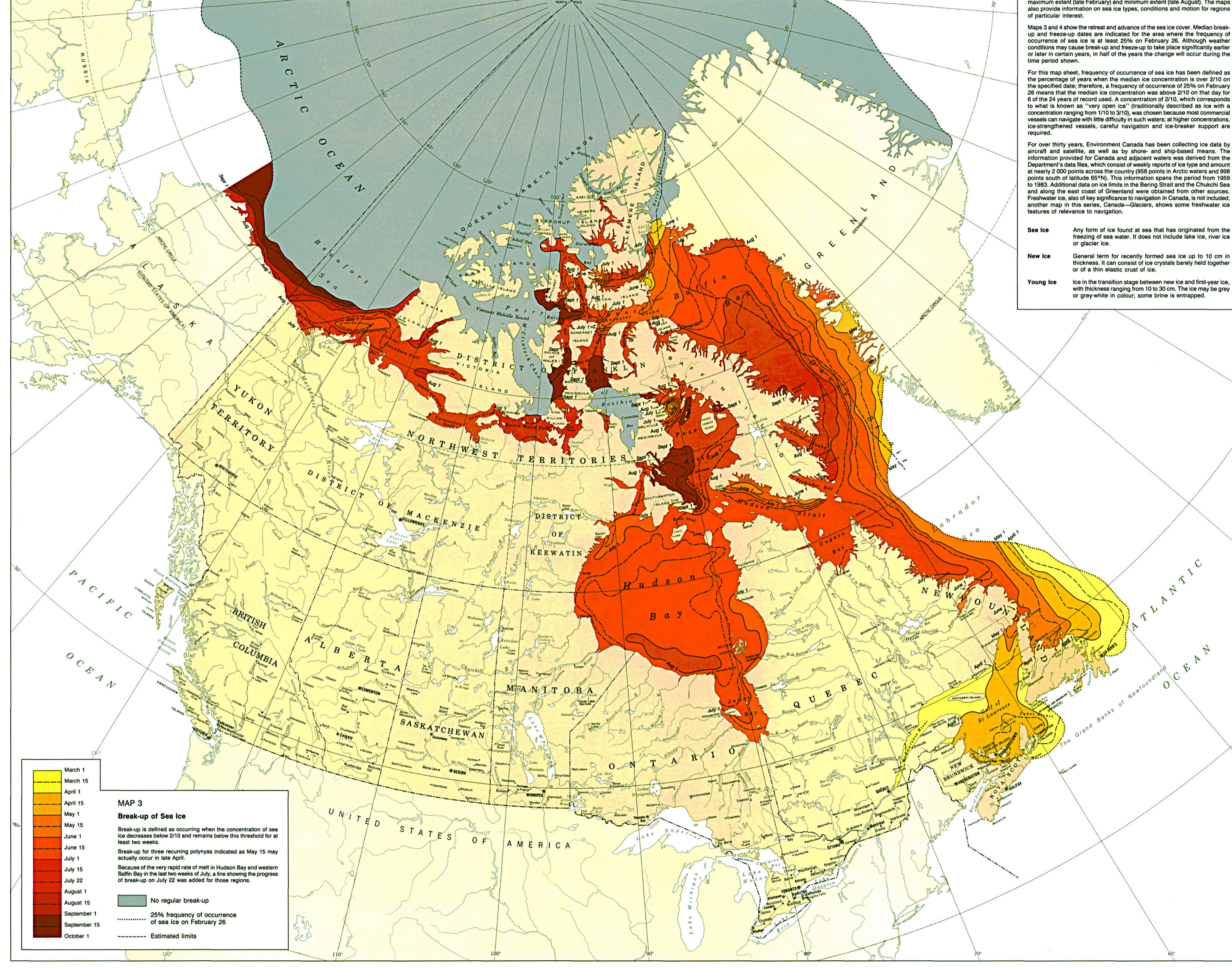
**New ice**  
 General term for recently formed sea ice up to 10 cm in thickness. It can consist of ice crystals barely held together or of a thin elastic crust of ice.

**Young ice**  
 Ice in the transition stage between new ice and first-year ice, with thickness ranging from 10 to 30 cm. The ice may be gray or gray-white in colour; some brine is entrapped.



**MAP 2**  
**Late Summer Sea Ice Conditions**  
 The frequency of occurrence expresses the percentage of years when the median concentration of sea ice is over 20% on August 27. The nature of the ice cover is shown where the median concentration of ice always exceeds 20% on August 27.

- Ice from the Gulf of St. Lawrence melts and disperses off Cape Breton Island, drifting southeast, south or southwest in response to prevailing winds.
- Labrador ice melts and disperses over the Grand Banks, and drift may carry it around Cape Race or around it for distances but never both simultaneously.
- Labrador ice only occasionally drifts south of latitude 50° 30'.
- The Labrador Current carries ice southward from Davis Strait and Baffin Bay. A small percentage of old ice is usually present in the spring months.
- The ice which rounds Cape Race from west Newfoundland waters is carried in the same southward direction as the ice in the Convoy Bay area, and the two meet in the spring.
- Maximum ice limit, generally based on a recording period of 24 years (1959-1983). In some areas, ice has been reported on only one occasion.



**MAP 3**  
**Break-up of Sea Ice**  
 Break-up is defined as occurring when the concentration of sea ice decreases below 20% and remains below this threshold for at least two weeks.

- No regular break-up
- 25% frequency of occurrence of sea ice on February 20
- Estimated limits



**MAP 4**  
**Freeze-up of Sea Ice**  
 Freeze-up is defined as occurring when the concentration of sea ice increases above 20% and remains above this threshold for at least two weeks.

- No regular break-up
- 25% frequency of occurrence of sea ice on February 20
- Estimated limits