



OUTLOOK FOR BREAK-UP OF ICE ON THE ST. LAWRENCE SEAWAY & LAKE ERIE ISSUED BY CANADIAN ICE SERVICE

prepared for
The Saint-Lawrence Seaway Management Corporation

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1. Average temperatures over Lake Erie, Lake Ontario and the Seaway have generally been above normal values. The table below indicates the departure from normal temperatures at specific locations, on a bi-weekly basis, for the period from mid-November to the end of January:

	November 16-30	December		January		16 Nov. – 31 Jan
		01-15	16-31	01-15	16-31	
Montreal	+2.4°C	+1.7°C	+2.1°C	+3.0°C	+7.9°C	+3.5°C
Kingston	+1.6°C	+0.7°C	+2.8°C	+3.0°C	+6.7°C	+3.0°C
Windsor	+2.6°C	-1.8°C	+0.6°C	+1.1°C	+6.2°C	+1.8°C

Ice growth commenced in the Western Basin of Lake Erie in the second week of December 2016, with new ice rapidly covering Sandusky Bay. The first ice appeared in Lake Ontario in the Bay of Quinte and sheltered bays in northeastern Lake Ontario near mid-December. This ice development was approximately one week ahead of the climatological normal from the 1981-2010 period.

Continued ice formation in the Western Basin and the Bay of Quinte saw these regions quickly become completely covered with new and thin lake ice through the third week of December. This expansion was unsustainable in the Western Basin though, as the ice cover diminished near the end of the month and retreated to the northern section of the basin.

In the first week of January 2017, the Western Basin experienced a return of ice coverage that led to new and thin lake ice reaching the shores near Cleveland. Ice in the Bay of Quinte thickened to the medium and thin stages of development and became consolidated during this period and the first significant amounts of new lake ice formed in the St. Lawrence River east of Kingston. An episode of unseasonably warm air temperatures beginning in the second week of January followed this growth stage and reduced the ice

cover in across the Western Basin again to an area of predominantly thin lake ice along the northern shore of the basin. Ice in the St. Lawrence River also underwent a significant reduction and predominantly open water conditions prevailed from Kingston to Cornwall with some consolidated ice remaining along the shores of the river east of Cornwall to Montreal through the end of January.

- The table below indicates the monthly average temperatures at some locations along the Seaway and in western Lake Erie:

	Average temperatures	
	December 2016	January 2017
Montreal	-4.3°C	-4.6°C
Kingston	-1.7°C	-2.7°C
Windsor	-1.9°C	-0.7°C

- The table below indicates the accumulated freezing degree days (FDD), the normal accumulated FDD and the percentage(%) of accumulated FDDs at various locations as of January 31:

	Accumulated FDDs (2016-17)	Normal accumulated FDD	% of normal accumulated FDD
Montreal	306	558	55%
Kingston	183	389	47%
Windsor	106	224	47%

- Ice conditions in the St Lawrence Seaway are described based on Radarsat-2 and MODIS satellite imagery from 27 to 31 January 2016. From the Beauharnois Canal and eastward, conditions consisted of predominantly open water with consolidated thin and medium lake ice along sections of the shore. From the Beauharnois Canal to Cornwall, the observed conditions were of very open drift to open drift new and thin lake ice. Predominantly open water conditions were noted from Cornwall to Kingston over this period as well, with some consolidated new and thin lake discerned in sheltered bays and inlets.
- Average surface air temperatures will be near normal across the Great Lakes and the St. Lawrence River valley in early February before transitioning to an above normal surface temperature regime from mid-February through April 2017. Due to these warmer than normal temperatures, formation of lake ice will cease earlier than normal and the breakup of existing ice will proceed earlier than the climate normal.

GENERAL OUTLOOK

Increases in ice coverage and thickness are expected to proceed slower than normal based on projections for warmer than normal surface air temperatures for the remainder of the winter 2016-17 season. Breakup of lake ice is forecasted to initiate earlier than the climatological dates this spring due to the expected anomalously warm air temperatures over the region.

Lake Ontario to Cornwall – Open drift to close pack new and thin lake ice is forecast from mid-February to the end of the month. Close pack to very close pack thin and medium lake ice from early March to mid-March. Breakup of ice will begin in the third week of March with predominantly open water conditions near the end of the month.

Cornwall to Montreal – Open drift to close pack new and thin lake ice with consolidated medium lake ice along the shore and in sheltered bays from early February to mid-month. Close pack to very close pack thin and medium lake ice from mid-February to mid-March with consolidated thick lake ice along the shores. Breakup of ice commencing in the third week of March with predominantly open water conditions near the end of the month.

Lake Erie – By mid-February, close to very close pack new and thin lake ice across the Western Basin and extending to Cleveland, near Buffalo, and within 20 nautical miles of the northern shore. Open drift to close pack new and thin lake ice over the central portion of the lake from Cleveland to Erie and predominantly open water elsewhere. Breakup will begin near the end of February and significant areas of open water will be present by mid-March in the western Basin and central sections of Lake Erie. The last remnants of lake ice will melt from the eastern section of Lake Erie by the end of March. Breakup is expected to be approximately one to two weeks earlier than the normal dates.

Contact:

Canadian Ice Service
Telephone: 1-877-789-7733
Email: ecweather-meteo@canada.ca