

**Seasonal Summary**  
**For The Great Lakes**  
**Winter 2004-2005**



**Produced by the Canadian Ice Service**  
**June 1<sup>st</sup> , 2005**

## Table of Contents

General Overview of the past ice season .....	3
Lake Superior.....	5
Lake Michigan.....	8
Lake Huron and Georgian Bay.....	11
Lake Erie and Lake St. Clair .....	15
Lake Ontario .....	18

## Table of Figures

Figure 1: Departure from normal ice concentration – January 17 <sup>th</sup> , 2005 .....	3
Figure 2: Departure from normal ice concentration – January 31 <sup>st</sup> , 2005 .....	3
Figure 3: Temperature trend for Sarnia – December 1, 2004 to April 4, 2005 .....	4
Figure 4: Weekly Ice Coverage for winter 2004-05 – Lake Superior.....	7
Figure 5: Normalized Ice Coverage for Lake Superior for March 5 <sup>th</sup> .....	7
Figure 6: Weekly Ice Coverage for winter 2004-05 – Lake Michigan .....	10
Figure 7: Normalized Ice Coverage for Lake Michigan for February 19 <sup>th</sup> .....	10
Figure 8: Weekly Ice Coverage for 2004-05 – Lake Huron. ....	13
Figure 9: Normalized Ice Coverage for Lake Huron for February 19 <sup>th</sup> . ....	14
Figure 10: Weekly Ice Coverage for 2004-05 – Lake Erie. ....	17
Figure 11: Normalized Ice Coverage for Lake Erie for February 12 <sup>th</sup> .....	17
Figure 12: Weekly Ice Coverage for 2004-05 – Lake Ontario. ....	20
Figure 13: Normalized Ice Coverage for Lake Ontario for February 19 <sup>th</sup> . ....	20
Figure 14: Departure from normal concentration – December 27 <sup>th</sup> , 2004.....	21
Figure 15: Departure from normal concentration – January 31 <sup>st</sup> , 2005.....	21
Figure 16: Departure from normal concentration – February 28 <sup>th</sup> , 2005.....	22
Figure 17: Departure from normal concentration – March 28 <sup>th</sup> , 2005. ....	22
Figure 18: Departure from normal concentration – May 2 <sup>nd</sup> , 2005.....	23

## General Overview of the past ice season

Generally, the past ice season was on the light side in terms of ice extend and thickness. However, the season was punctuated with periodic ice conditions that could be termed as more difficult than normal. In particular, the last two weeks of January where temperatures were much below or very much below normal and fostered the expansion of the ice coverage from a less than normal ice regime to a greater than normal ice regime (Figure 1 and 2).

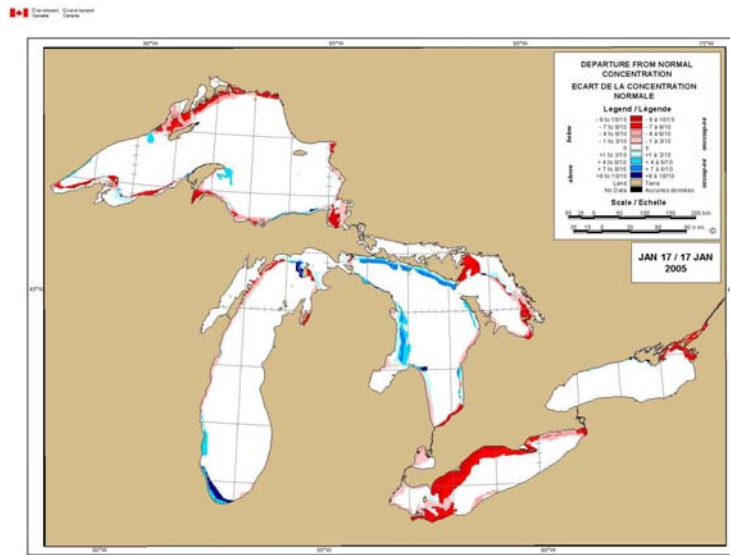


Figure 1: Departure from normal ice concentration – January 17<sup>th</sup>, 2005

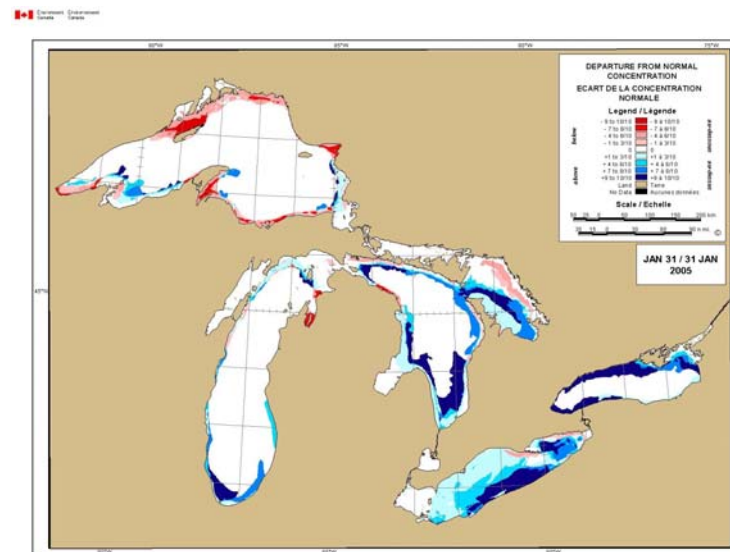


Figure 2: Departure from normal ice concentration – January 31<sup>st</sup>, 2005

Another interesting fact of the past season was the oscillation between above and below normal temperatures. The cycles lasted about 15 to 20 days (Figure 3) and

began with above normal temperatures during the first half of December. The remainder of the winter continued with this pattern. However by the middle of February until the end of March, temperatures remained below normal. This period, for the most part, was distinguished by clear skies permitting incoming solar radiation which began the ice deterioration process. Hence, the impact of the cooler than normal temperatures during that period were somewhat muted in terms of ice formation.

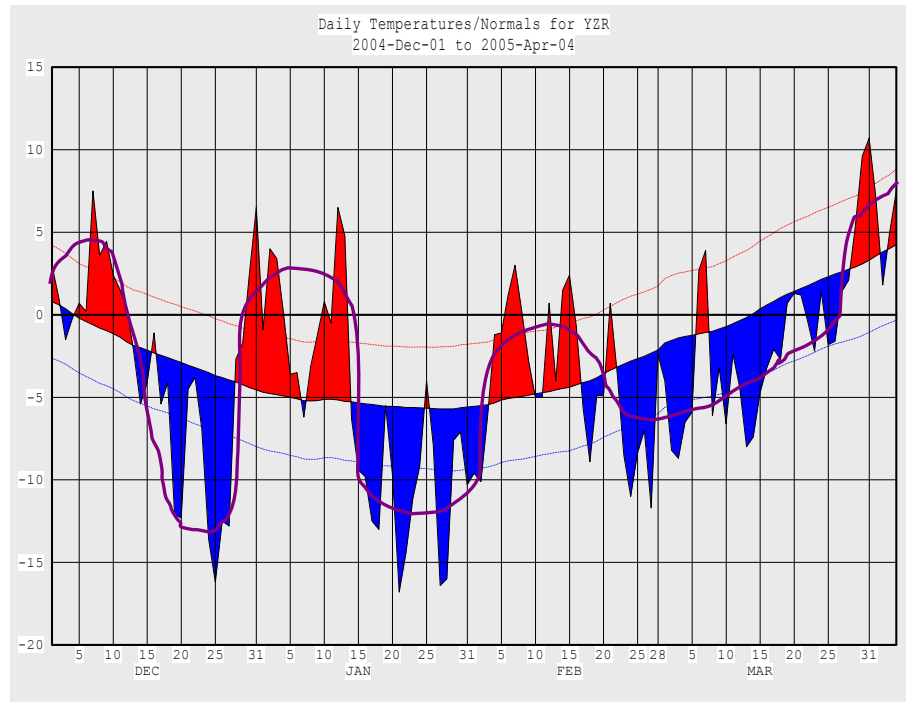


Figure 3: Temperature trend for Sarnia – December 1, 2004 to April 4, 2005

For the most part, the less than normal ice extent can be attributed to the much above normal temperatures observed during the first half of February. It caused a significant loss of ice during that period which was never recovered over the balance of the winter season. With longer days, ice formation was not as vigorous despite the below normal temperatures. By the end of March and into April, the ice season was quickly winding down as significant rain and wind events caused substantial ice destruction. As indicated earlier, one of the factors that caused such a rapid decrease in ice coverage was the number of relatively clear days during the later part of March. During the last 19 days of March, 13 of those days had most of the lakes under clear skies. The incoming solar radiation had the effect of weakening the ice structure despite the below normal temperatures.

## Lake Superior

The season in Lake Superior began with above to much above normal temperatures during all of November and the first half of December. Ice started forming in northern portions of Black Bay during the first week of December. By the middle of December, most of Black Bay and the northern portion of Nipigon Bay were covered with ice. Elsewhere in Lake Superior no significant ice had begun to form. The second half of December was characterized by much below normal temperatures during the third and the beginning of the fourth week however temperatures warmed to above normal for the last half of the fourth week of the month. Ice formation began in earnest with below normal temperatures during most of the last two weeks of December. At the end of December, parts of Thunder Bay, most of Nipigon and Black Bays, the coastal area of Whitefish Bay and parts of the south-western shore of Lake Superior had some ice. At that time, ice conditions were near normal to slightly earlier than normal except in most of Thunder Bay where conditions were later than normal (Figure 14).

The first half of January had near to slightly below normal temperatures over the western and central portion of the lake while the eastern section had above normal temperatures. Despite the cooler temperatures over the western and central portion of the lake, the ice regime was still generally less than normal except for some isolated sections of the lake at the middle of January. In fact, the ice extent was less than normal along the north-western and southern shores of the lake as well as in Whitefish Bay. Mostly thin and new lake ice covered the southern and eastern shore including Whitefish Bay as well as sections of the north-western shore of the lake. Fast thick and medium lake ice covered Nipigon, Black and Thunder Bays. The remainder of the lake was still open water to ice free.

The second half of January was mostly below to much below normal until a few days before the end of the month where temperatures recovered and reached much above or very much above normal values. At the end of the month, greater than normal ice extent was observed over the eastern and south-western shore of the lake while the north-western and south-eastern shores had less than normal ice extent (Figure 15). The ice was mostly thin and medium lake ice along the coastal area and in north-eastern Whitefish Bay. All of Nipigon and Black Bays as well as most of Thunder Bay and the south-western part of Whitefish Bay were covered with fast thick and medium lake ice.

The first half of February continued on the same arc as the end of January. Temperatures were above normal during this period. The ice extent shrunk so that by the middle of the month only patchy areas of thick lake ice along the southern and eastern shore of the lake prevailed. Normally most of the western half of the lake would be covered with ice while the rest of the coastal area would have ice extending about 10 to 30 miles from the coast.

Temperatures for the second half of February cooled off to below normal values. Despite the cooler temperatures, no significant ice growth occurred during the period.

The ice along the coastal area of the lake extended about 5 to 20 miles from the shore and was composed of mostly thin and medium lake ice. The remainder of the lake was mostly open water. Normally two thirds of the lake would be covered with Whitefish Bay being covered with fast thick lake ice (Figure 16).

The entire month of March had below normal temperatures except at the very end where they began to climb back to above normal values. During the first half of the month the ice edge along the north-western shore expanded to about 35 to 50 miles from the shore while the rest of the coastal area had a more modest expansion of 15 to 40 miles. After mid-month the ice edge began to retreat so that by the end of the March, the ice was only about 5 to 20 miles from the shore. The coastal area from Michipicoten Bay to Marathon was open water at that time. The ice in Whitefish Bay finally became fast during the last week of the month (Figure 17).

The first half of April temperatures were above or much above normal. Ice continued to deteriorate. Most of the ice along the shore melted during the first week of April. By the middle of the month only a few patches of ice remained. The fast ice in Thunder Bay fractured so that only the north-eastern reaches of the bay remained intact. The fast ice in Whitefish Bay fractured early in April. By the middle of the month, only a few patches of ice remained. Black and Nipigon Bays remained fast.

For the last two weeks of April, temperatures were above or much above normal during the third week but cooled off to below or much below for the last week of the month. The ice in Nipigon Bay fractured during the third week and was open water near the end of the month. As for Black Bay, the fracture event occurred early in the fourth week however by the end of the month a band of thick to very thick lake ice still prevailed. Thunder Bay cleared during the last few days of the month. The remainder of the lake was ice free at the end of April. The clearing of Black and Nipigon Bay cleared earlier than normal (Figure 18).

During the first two weeks of May, temperatures were generally below normal over the entire area. Black Bay cleared during the first week of May. The rest of the lake was ice free.

The entire ice season was generally characterised by less than normal ice coverage (Figure 4). In fact at no point during the season did the ice reach near normal ice extent. Normally, the maximum ice extent during an ice season is recorded around March 5<sup>th</sup>. Upon further inspection, only once since 1995-96 did the ice extent expand above the normal extent for Lake Superior for March 5<sup>th</sup>. Prior to 1995-96, the number of seasons where the ice extent did not reach above the normal ice extent on March 5<sup>th</sup> occurred on nine occasions since 1972-73 (Figure 5).

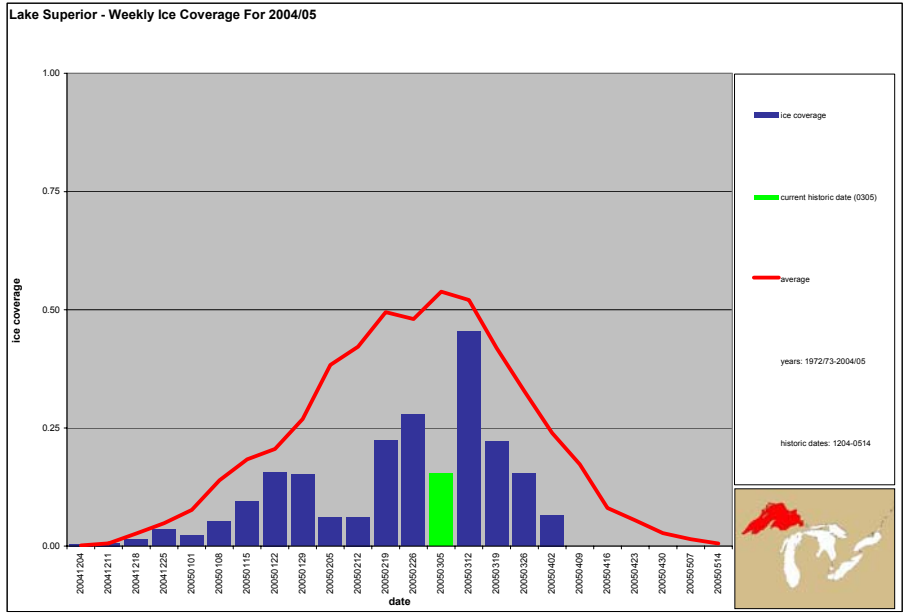


Figure 4: Weekly Ice Coverage for winter 2004-05 – Lake Superior.

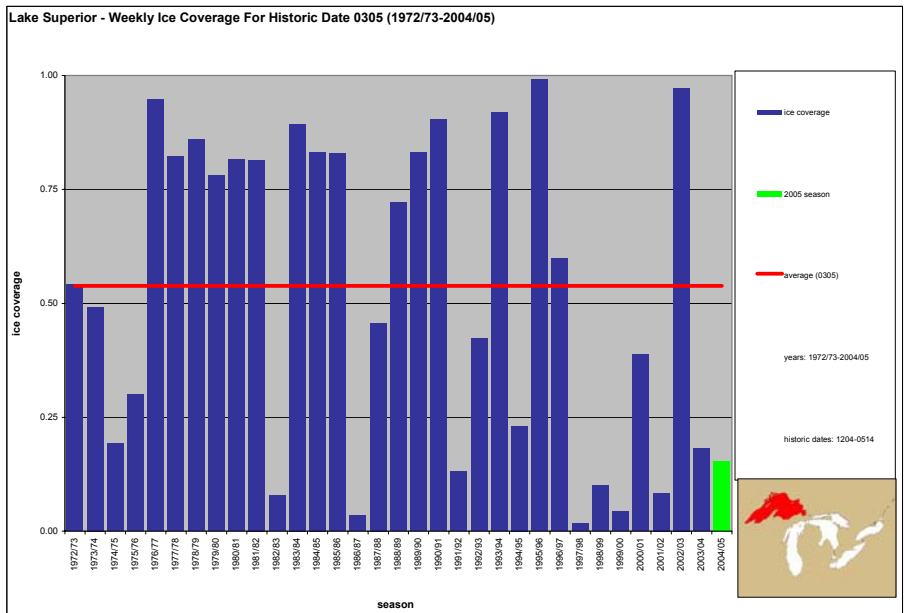


Figure 5: Normalized Ice Coverage for Lake Superior for March 5th.

## Lake Michigan

Temperatures during the last half of November were much above normal over the entire lake. The trend continued into the first half of December. However temperatures took a nose dive during the third week and persisted until the last few days of the month where above normal temperatures invaded the lake area. Ice did not begin to form until late in the third week of December. New lake ice formed from the Straits of Mackinaw westward along the coast to the northern entrance of Green Bay. The southern third of Green Bay had new lake ice while the Little and Big Bay de Noc had new and thin lake ice. A narrow band of new lake ice formed along the eastern shore of the Door Peninsula. By the end of the month, new and thin lake ice from the Straits of Mackinaw stretched southwestward to Beaver Island and along the northern shore of Lake Michigan. The southern half of Green Bay as well as the Little and Big Bay de Noc and the northern portion of Green Bay were covered with thin and new lake ice. Some isolated patches of new ice formed along the western and southern coastal area of the lake. Elsewhere, conditions were mainly open water to ice free (Figure 14).

Most of the first two weeks of January were characterized by above or much above normal temperatures until a few days before mid-month. At that point, temperatures took a plunge to much or very much below normal values. Some melt and destruction occurred during the first week however ice growth began later in the second week of January. The ice in the Straits of Mackinaw reformed and expanded to cover the northeastern portion of the Lake northeast of Beaver Island. Mostly medium and thick lake ice covered the area. Some new and thin lake ice extended along the shore from the northeastern portion of the lake to the entrance to Green Bay. All of Green Bay was covered within medium and thin lake ice with fast ice in the Little and Big Bay the Noc. A narrow band of new and thin lake ice hugged the western coast of the lake from the entrance to Green by southward to near Michigan City.

Much to very much below normal temperatures persisted into the third week. The temperature regime moderated during the last week of January into the near or above normal range. By the end of the third week, the northeastern portion of the lake became covered with fast thick lake ice northeast of Beaver Island. The Little and Big Bay de Noc as well as the southern half of Green Bay were also covered with fast thick lake ice at the same time. By the end of the month, within 10 miles south of the fast ice edge in northeastern Lake Michigan, mostly thin and new lake ice prevailed. The central part of Green Bay had thick and medium lake ice. The western and southeastern coast of the lake was covered with a narrow band of new and thin lake ice. The southern section of the lake had a 3 to 10 miles wide band of thin lake ice along the coast. The remainder of the lake was open water with the central part of the lake was ice free (Figure 15).

Temperatures for the month of February started with warmer than normal temperatures but soon after the middle of the month, the mercury plunged back to below normal. The first week of February, temperatures were very much above normal while the second week was above to much above normal. The concentration of the ice in the northeastern part of the lake decreased during the first half of the month. The



area of fast ice remained intact from the straits to Scott Point. The rest of northeastern Lake Michigan from about 10 miles southwest of Beaver Island northwards was covered with loose medium and thick lake ice. At the middle of February, most of Green Bay was fast except for the northern portion near the entrance to the bay where mostly thick and medium lake ice prevailed. Some bands of thin and new lake ice were also present at the time.

The last half of the month, temperatures were near to below normal values. The area of fast ice in the Straits of Mackinaw began to extend southwestward to reach Beaver Island by the end of the month. The mobile thin and medium lake ice in the northeastern section of the lake retreated somewhat during the period. The north central portion of Green Bay remained mobile over the two week period. No patches of new or thin lake ice were present along the remainder of the coastal area of the lake. Elsewhere, mainly open water with ice free conditions in the central part of the lake (Figure 16).

The below normal temperature trend continued into March. In fact the first three weeks of the month were much or very much below normal while the last week was above normal. Hence the ice in northeastern Lake Michigan expanded southwestward to about 15 to 20 miles south of Beaver Island and thickened to thin and medium lake ice. The ice drifted into Grand Traverse Bay during the first week. However the ice began to retreat during the second week so that the ice edge was located about 5 miles south of Beaver Island. Also the fast ice from northern Beaver Island northeastward had fractured however the fast ice from the straits along the north shore to Scott Point remained intact. At the middle of March, within 10 to 15 miles of the shore from the Door Peninsula northward to Scott Point, mostly new and medium lake ice with some thick lake ice was present. The fast ice in the southern two thirds of Green Bay and in the Little and Big Bay de Noc remained unchanged while the northern portion of Green Bay had thick and medium lake ice. The second half of March marked the shift from ice expansion to ice melt. At the end of March, the ice in the northeastern part of the lake pulled back to a northwest-southeast line through the northern portion of Beaver Island. The mobile ice in the northern portion of Green Bay loosened so that areas of open water developed. The extreme southern portion of Green Bay developed a small area of open water. Otherwise no significant change occurred with the remainder of the fast ice. The rest of the lake was open water with ice free south of 4500N (Figure 17).

The flip in temperature regime in late March from below to above normal continued into April. Above or much above normal temperatures persisted for the first three weeks of the month but shifted to below normal values thereafter. The mobile ice in the northern portion of the lake melted during the first week of April while all the fast ice fractured in the area. Significant clearing occurred quickly during the second week so that by the middle of the month most of the northern part of Lake Michigan was open water except for a small patch of rotten thick lake ice near Scott Point. The remainder of the lake was ice free. As for Green Bay, most of the ice had melted except for a few isolated patches of thick or very thick lake ice. The Little and Big Bay de Noc continued to have high concentrations of thick and very thick lake ice. Near the end of the third

week, all ice in the Green Bay area including the Little and Big Bay de Noc had melted and ice free conditions prevailed in the bays as well as all of Lake Michigan (Figure 18).

Overall, the ice extent over Lake Michigan during the winter season 2004-05 was less than normal except for the third week of December and the third week of January (Figure 6). In fact the ice extent observed on February 19th has exceeded the normal value on only two occasions since 1993-94 (Figure 7)

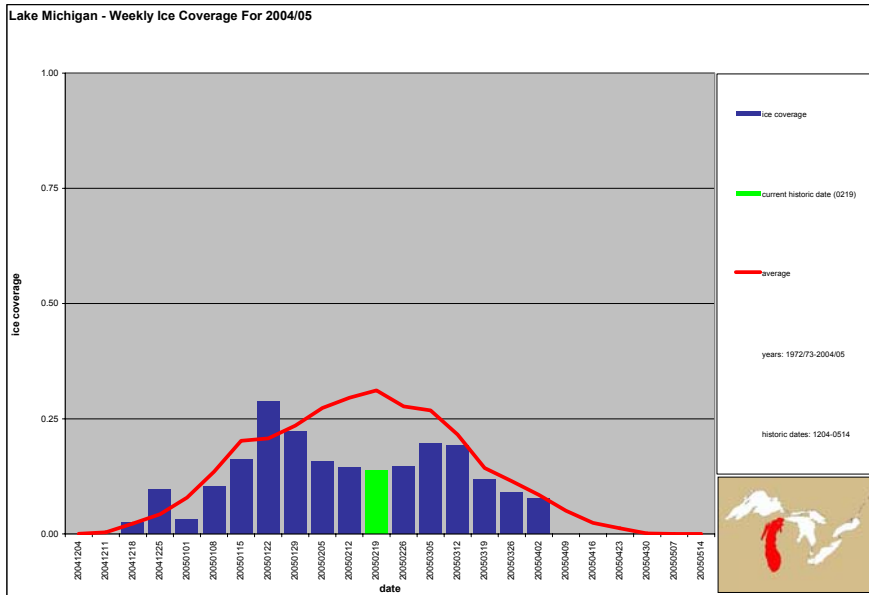


Figure 6: Weekly Ice Coverage for winter 2004-05 – Lake Michigan

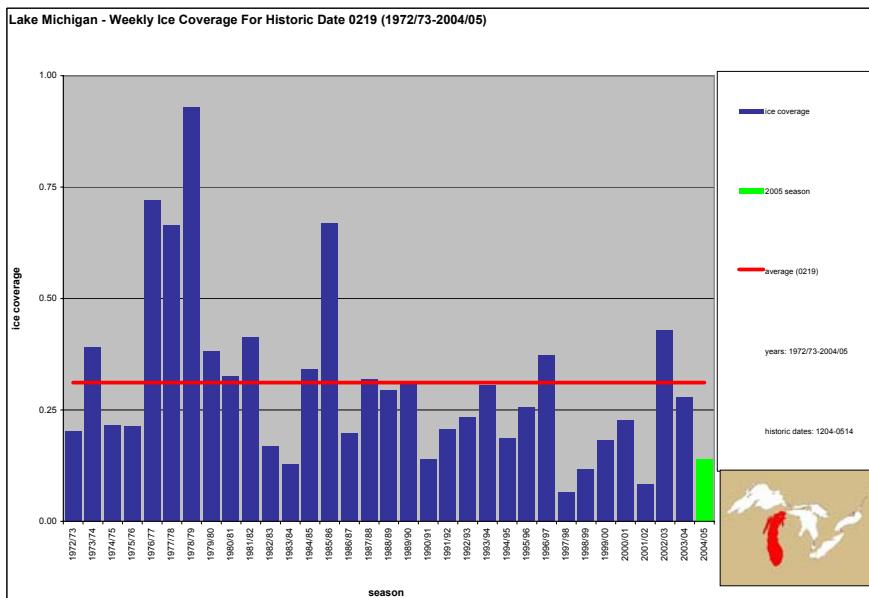


Figure 7: Normalized Ice Coverage for Lake Michigan for February 19th.

## **Lake Huron and Georgian Bay**

Temperatures were above normal during the first half of December. The second half of the month had much below normal temperatures until the last few days of December where they bounced back to much above normal. No significant ice growth occurred during the first week and part of the second week. Some new and thin lake ice began to form in the smaller bays in the North Channel near the middle of the month. With the cooler temperatures in the latter part of December, ice growth began along the coastal area of the lake, in the North Channel and Georgian Bay. Near the end of the month, the northern shore of the North Channel, the northeastern shore of Georgian Bay, the western coastal area of Lake Huron south of Thunder Bay, the eastern coast south of Point Clark and all of Saginaw Bay had thin lake ice. The remainder of the lake was open water to ice free (Figure 14).

The first half of January continued with the warm trend observed at the end of December. However just before the middle of the month, temperature took a plunge to much or very much below normal values. Little change in the ice extent occurred during the first half of the month however some of the ice thickened to medium lake ice with mostly thin and new lake ice covering those areas. After the middle of the month, ice expansion occurred in earnest. Saginaw Bay became fast with medium and thick lake ice by the end of the third week of January while the North Channel was covered with fast thick lake ice at the end of the month. The Straits of Mackinaw became fast medium lake ice during the last few days of January. At month's end, the coastal area of Lake Huron North of Saginaw Bay was covered with ice extending about 5 to 15 miles from the shores. Most of the ice was thin and medium lake ice with some medium lake ice. The southern portion of Lake Huron was almost entirely covered except for the north central portion of the area where open water prevailed. The ice in the area was mostly thin and medium lake ice. Saginaw Bay became fast while all of Georgian Bay was covered with ice during the last week of January. The northern two-thirds of the bay were covered with thin and medium lake ice with the remainder of the bay covered with looser thin and new lake ice (Figure 15).

At the very end of January and the first half of February, temperatures jumped up to much above or very much above normal temperatures over the area. For the balance of the month temperatures dipped but only to below normal values. The general effect during the first half of the month was to stifle ice growth or melt some of the thinner ice. At the middle of February, the northern and western portions of Lake Huron within 10 to 20 miles of the shores were covered with medium lake ice whereas the rest of the lake was open water to ice free. Isolated patches of fast ice prevailed along the Bruce Peninsula. In Georgian Bay, the northern two-thirds of the bay were covered with medium and thick lake ice. The southern portion of the bay had open water. Both the North Channel and Saginaw Bay were still fast with thick lake ice while the Straits of Mackinaw had medium and thick fast lake ice. During the second half of the month with cooler than normal temperatures, some ice growth occurred however ice extent still lagged behind normal. At the end of February, the ice extent around the coastal area of Lake Huron extended about 5 to 25 miles from the shore and was composed of mostly

medium and thin with some thick lake ice. The southern portion of the lake was completely covered with medium and thick lake ice. The majority of Georgian Bay was covered with medium and thin lake ice with the northeastern coastal area being fast with thick with some very thick lake ice. Only the southwestern portion of the bay had open water (Figure 16).

Temperatures were much below normal over the entire lake for most of the month of March however by the end of the month above normal temperatures blanketed the area. The ice extent increased somewhat. The ice in the northwestern portion of the lake expanded eastward to reach out about 70 miles from the Straits of Mackinaw. No change was observed in the fast ice in Straits of Mackinaw, Saginaw Bay and the North Channel. The ice in the southern portion of the lake drifted eastward during the period and created an area of open water with a 10 to 15 miles wide band of medium and thick lake ice along the south-eastern shore of the lake at mid-month. A very narrow band of medium lake ice was present along the western shore of the Bruce Peninsula. The entire area of Georgian Bay became covered with ice during the first two week of March. Mostly thin and new ice covered the bay with some medium and thick lake ice in the southern portion of the bay. After the middle of the month, the general ice coverage decreased significantly. By the end of March, no ice was present along the northern portion of the lake. The northwestern section of the lake just east of the Straits of Mackinaw to near Thunder Bay had a band about 10 to 15 miles from the shore of loose medium and thin lake ice. From Thunder Bay southward to the entrance to Saginaw Bay, the coastal area was mainly open water. No significant change occurred to the fast ice in Saginaw Bay however some patches of thick lake ice drifted out of the entrance to the bay. The southwestern portion of the lake still had a significant amount of medium and thick lake ice at the end of the month. The eastern shore from Grand Bend northward to Port Elgin was open water with a narrow band of thick lake ice from Port Elgin to mid-way up the Bruce Peninsula. The remainder of the Lake was open water to ice free. In Georgian Bay, most of the bay was still covered with medium and thick lake ice. The northwestern section of the bay had weaker concentrations. The fast ice along the shore in the bay remained intact during the last two weeks of March (Figure 17).

Temperatures were above to much above normal during the first week of April but cooled off to near or above normal for the second. The third week was above to much above but cooled off to much below for the last week of the month. The onset of melt and ice destruction was well on its way during the first half of April. Open water persisted along the north shore of the lake. The fast ice began to break up in the northwestern part of the lake including the Straits of Mackinaw. By the middle of the month, only a few small bays in the area had rotten thick lake ice. No ice was present along the shore from the straits to the entrance to Saginaw Bay after the first week of April. The fast ice in Saginaw Bay fractured early in the month and became ice free by mid-month. The ice in southern Lake Huron decreased significantly so that by the middle of April only open water to ice free conditions prevailed. The eastern shore of the lake was open water during the first week and ice free by the end of the second. Georgian Bay cleared quickly during the first week. Only the rotten fast thick and very thick lake ice in the smaller bays along the northeastern shore remained. All of the

North Channel fractured a few days before the middle of the month. During the third week, ice free conditions prevailed over Lake Huron. The fast ice of the smaller bays in Georgian Bay fractured and melted quickly during the third week of April. By the fourth week ice free conditions covered the bay. The ice in the North Channel shifted eastward and melted or was destroyed during the third week. By the middle of the last week of April, open water to ice free conditions prevailed everywhere (Figure 18).

The ice extent for Lake Huron and Georgian Bay was near normal during the 2004-05 season except for the month of February where coverage was less than normal (Figure 8). The ice extent for the historic date of February 19<sup>th</sup>

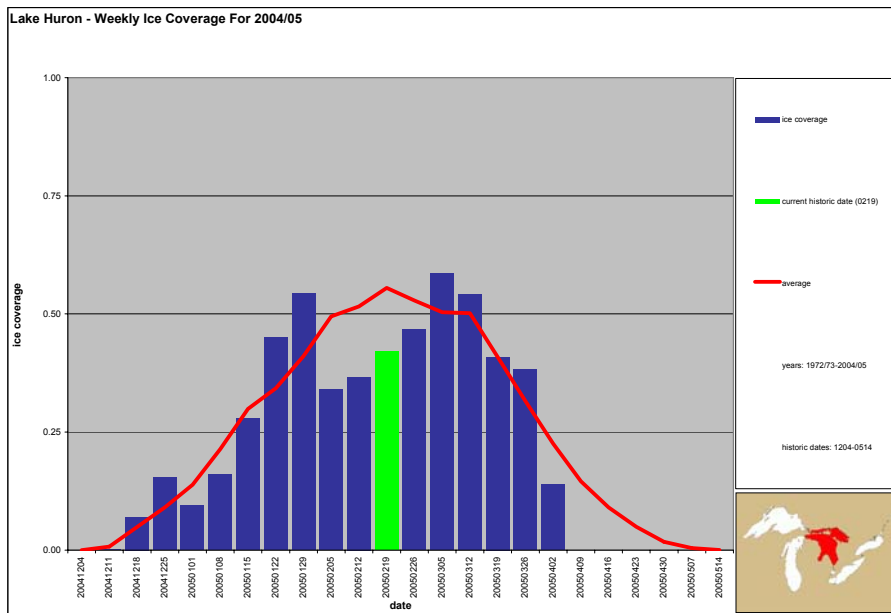


Figure 8: Weekly Ice Coverage for 2004-05 – Lake Huron.

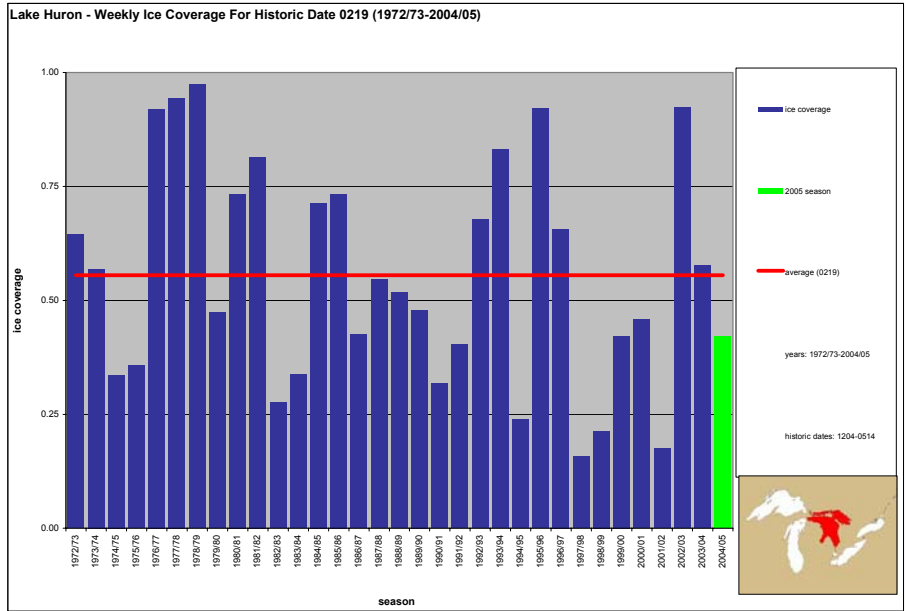


Figure 9: Normalized Ice Coverage for Lake Huron for February 19<sup>th</sup>.

## **Lake Erie and Lake St. Clair**

The temperatures were above normal during most of the first half of December however just before mid-month temperatures took a plunge to below or much below normal values. Before the end of the month, the mercury climbed back to above normal values. No significant ice growth occurred during the first two weeks however some new and thin lake ice began to appear in Lake St Clair, the coastal area of the Western Basin and in Long Point Bay. By the end of the month, all of Lake St Clair and the Western Basin were covered with thin and new lake ice. Long Point Bay became fast during the last week of December (Figure 14).

The trend from late December continued into the first half of January where temperatures were much above or very much above normal. The second half of the month was a complete reversal in terms of temperatures where much to very much below normal temperatures blanketed the lake. Little change occurred to the ice coverage over the lake during the first half of the month. However, after the mid-point of the month, ice growth increased greatly so that by the end of the third week of January most of Lake Erie was covered with new and thin lake ice with thick and medium lake ice in the Western Basin and Lake St Clair. At the end of the month, all of Lake Erie and St Clair were completely covered. Most of Lake Erie had medium and thin lake ice except along the northern shore where mostly new and thin lake ice prevailed. The southern portion of the Western Basin had fast thick and medium lake ice while the northern portion of the basin remained mobile. All of Lake St Clair was fast during the last week of January (Figure 15).

Temperatures moderated to above or much above normal values during the first half of February. The second half of the month saw a return to below normal temperatures. The ice pack during the first two weeks of the month remained somewhat stable where no significant ice growth or destruction occurred. By the middle of the month, a narrow band of open water developed along the southern shore east of the Western Basin as a more southwesterly circulation prevailed over the region during the previous few days. The rest of the lake was covered with medium and thick lake ice. The exception was the area along the north shore from Erieau eastward including most of the area east of Long Point where very open drift thin lake ice covered these areas. The southern portion of the Western Basin and all of St Clair Lake were fast with thick lake ice. The northern half of the Western Basin was covered with thick and medium lake ice. During the second half of February, the general circulation was light from the north. The thicker ice was pushed towards the southern shore of the lake while new and thin lake ice formed in its wake. By the end of the month, the southwestern side of Lake St Clair became mobile while the rest of the lake remained fast with thick lake ice. The fast ice along the southern portion of the Western Basin fractured during the last week and became covered with thick and medium lake ice. The rest of the lake was covered by a band of medium and thick lake ice within 15 to 35 miles of the southern shore. Over the remainder of the lake, mostly thin and new lake ice with some medium lake covered the area (Figure 16).

Temperatures for the month of March over Lake Erie were below or much below normal except at the end of the last week where temperatures finally edge to above normal values. The second week was particularly cool as very much below normal temperatures were recorded during that period. Despite the cooler than normal temperatures during the first half of March, signs of break-up began to appear during the second week. During the first week the fast ice in Lake St Clair began to fracture in the western part of the lake. By the middle of the month, the eastern part of the lake remained fast. The Western Basin began to clear from the northwest during the second week so that by mid-month, most of the basin was open water with the eastern entrance having looser thick and medium lake ice. The clearing continued in the rest of Lake Erie although at a slower pace. The area from Port Bruce to Point Pelee was open water to a few tenths of thin and new ice. Within about 20 miles of the south shore thick and medium lake ice covered the area from just east of Cleveland to the eastern tip of the lake. Beyond 20 miles of the shore and west of Cleveland mostly medium and thin lake ice conditions prevailed at the middle of the month. Clearing continued during the second half of March from northwest to southeast in Lake Erie while more fast ice fractured in Lake St Clair. By the end of the month, all of the fast ice in Lake St Clair has fractured. The northwestern two-thirds of the lake was open water with only the southeastern portion having rotten thick lake ice. During the third week, the Western Basin was open water and became ice free at the end of the month. The remaining ice in Lake Erie was located from about 20 miles west of Cleveland and was within 20 miles of the southern shore. Mostly thick and medium lake ice was located within 10 miles of the shore. The remainder of the lake was open water (Figure 17).

The month of April continued on the near or above normal temperature trend established at the end of March. Hence, the deterioration of the ice pack continued in earnest. Lake St Clair became open water early in the first week of April and ice free in the second week. The ice pack in Lake Erie was compressed along the southern shore due to a light northerly circulation during the last half of March and into the first week of April. By the end of the first week only a few patches of rotten thick lake ice was visible along the southern shore. By the middle of April, the entire lake was ice free (Figure 18).

The start of the ice season was relatively normal in terms of ice extent however the progression was halted during the first half of January. From mid-January to the end of the extent was greater than normal. The exception was the week of February 12th where the extent was less than normal (Figure 10 and 11).



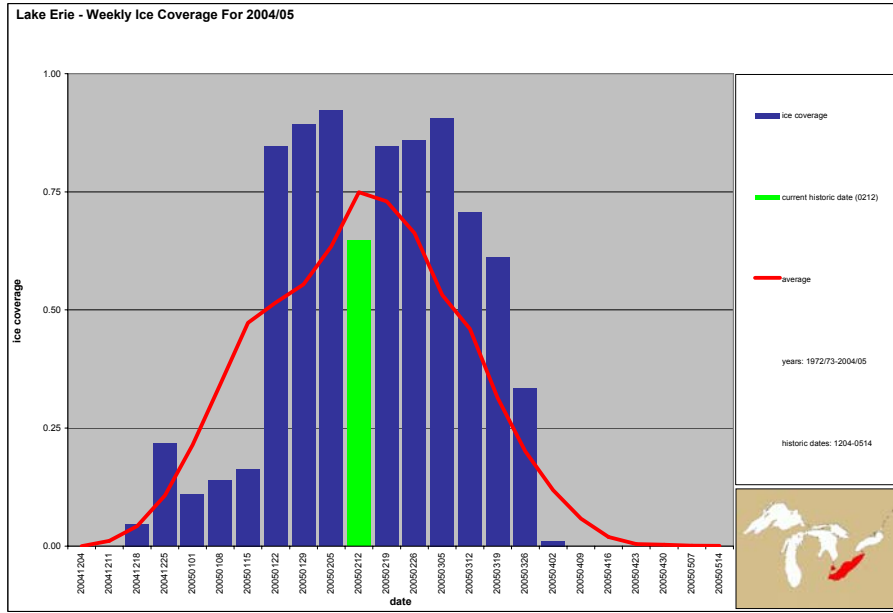


Figure 10: Weekly Ice Coverage for 2004-05 – Lake Erie.

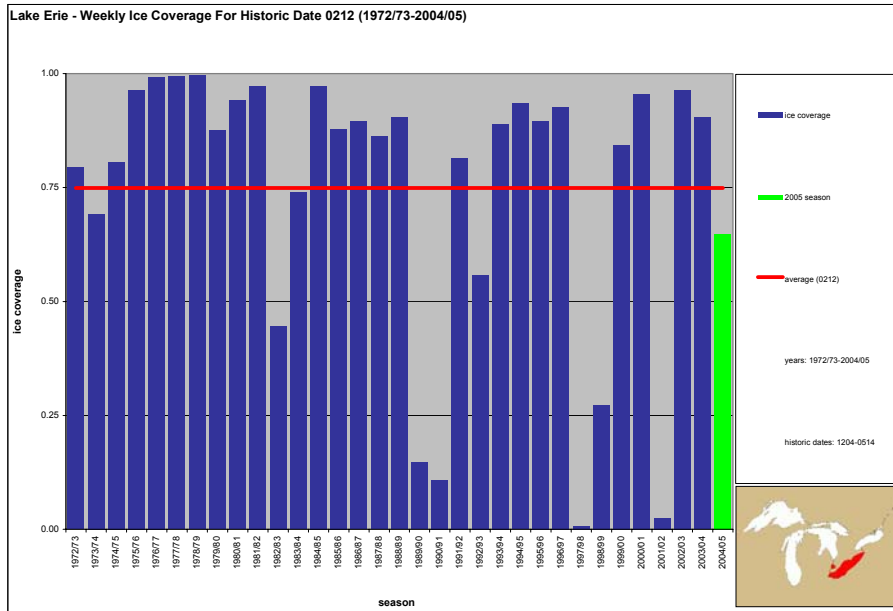


Figure 11: Normalized Ice Coverage for Lake Erie for February 12th.

## Lake Ontario

Temperatures during the last half of November over the entire Lake Ontario region was above or much above normal. No ice formation occurred. The first half of December was characterized by near to above normal temperatures over the entire region. During the third and most of the fourth week saw the mercury take a plunge to below normal values however the last few days of the month had above normal temperatures. Traces of new lake ice began to form in the Bay of Quinte as well as in the St Lawrence River near the middle of the month while the rest of the lake remained ice free. No significant amount of ice formed during the third week however the Bay of Quinte became fast during the fourth. Coastal new and thin lake ice began to form along the Prince Edward County Peninsula during the last week as well as the northeastern portion of Lake Ontario near the approaches to the St Lawrence River (Figure 14).

The temperature trend from the end of December carried over into the first half of January. Temperatures were very much above normal. Near the middle of the month, the regime flipped to below normal. The last two weeks of the month had the harshest temperatures of the season over Lake Ontario. Very much below normal, especially during the third week, prevailed until the end of the month. The ice coverage did not expand during the first two weeks over the area however the ice in the Bay of Quinte and parts of the St Lawrence River had thickened to medium and thin lake ice. After the middle of the month, ice began to form rapidly. The coastal areas of the lake saw narrow bands of new and thin ice form while the northeastern portion of the lake near the entrance to the St Lawrence River was covered with thin and new lake ice. The St Lawrence River was fast at the beginning of the fourth week with medium lake ice. At the end of the month, a band of new and thin lake ice had formed within 5 to 15 miles of the northern shore west of the Prince Edward County Peninsula and within 2 to 7 miles of the southern shore. The northeastern part of the lake east of the Prince Edward County Peninsula was covered with thin and new lake ice. The remainder of the lake was open water to ice free (Figure 15).

After the first few days of February, temperatures switched from below normal to above normal. The first two weeks of February were generally above or much above normal. Temperatures switched again to below or much below normal values after the middle of the month and persisted until the end of February. The ice coverage began to retreat to a near normal ice extent. By the middle of February, the southern shore was essentially open water to ice free while the north shore of Lake Ontario and around the Prince Edward County Peninsula only had a narrow band of new lake ice. The approaches to the St Lawrence River were still covered with loose medium and thin lake ice. Despite the colder than normal temperatures during the second half of the month no significant ice expansion occurred however the ice did thicken. By the end of the month, the smaller bays along the coastal area of the Prince Edward County Peninsula had fast thick lake ice. The approaches to the St Lawrence River in the northeastern portion of Lake Ontario were covered with thin and medium first year ice (Figure 16).

The month of March continued with the below normal temperature recorded during the latter part of February. In fact the below or much below normal temperatures ran until the last week of the month where finally the mercury climbed to above normal values. No appreciable change occurred with respect to ice extent however a few narrow bands of new ice had formed during the first week of March along the southern shore. By mid-month, there was still a loose band of new lake ice along the Prince Edward County Peninsula as well as the western side of the approaches to the St Lawrence River. The eastern portion of the approaches was covered with thin and medium lake ice. Some new and thin lake ice had drifted south from the approaches to Port Ontario along the eastern shore of Lake Ontario. During the third week the band of ice along the eastern shore of the lake got wider while the western approaches began to clear. During the last week of the month, the fast ice in the Bay of Quinte, the St Lawrence River as well as the small bays around the coastal area of the Prince Edward County Peninsula fractured. Most of the ice in the approaches to the River had melted except for some patches of rotten fast ice (Figure 17).

Temperatures were near or above normal over the entire lake for the first half of April. Clearing continued in the Bay of Quinte so that by the second week ice free conditions prevailed. The fast ice in the approaches to the St Lawrence fractured during the first week and melted completely at the beginning of the second week. The entire approaches as well as the St Lawrence River became ice free during the second week (Figure 18).

The ice season for Lake Ontario was slow to start but regained lost ground after mid-January. However, the ice extent had once again dipped below normal from mid-February to mid-March but recovered to normal values for the rest of the month of March (Figure 12). Once again, the ice extent at its apex on February 19th was less than normal for Lake Ontario (Figure 13).

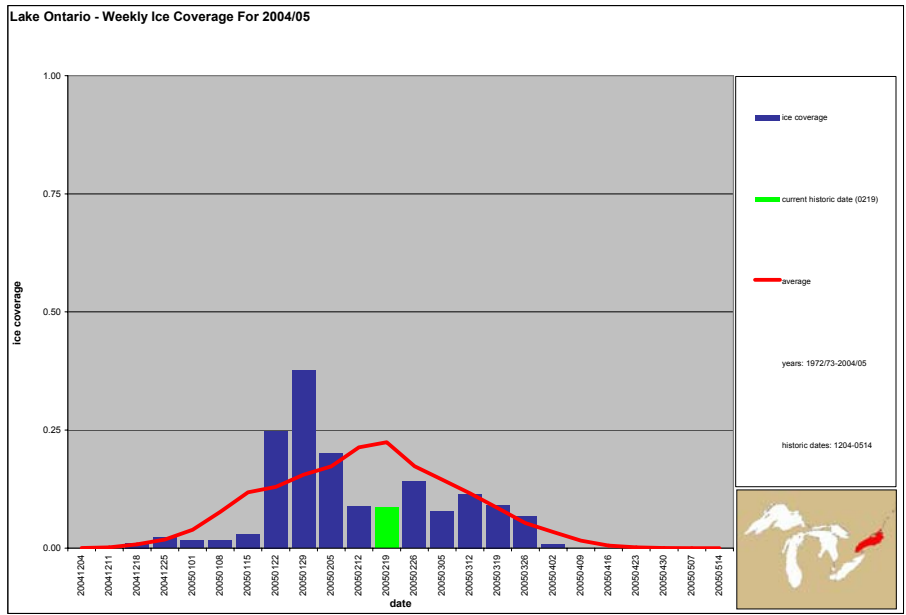


Figure 12: Weekly Ice Coverage for 2004-05 – Lake Ontario.

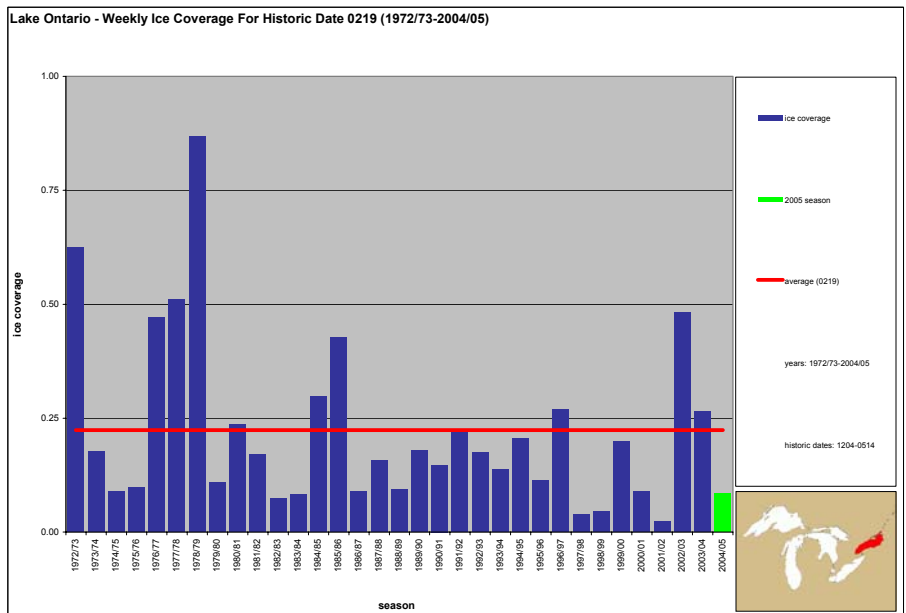
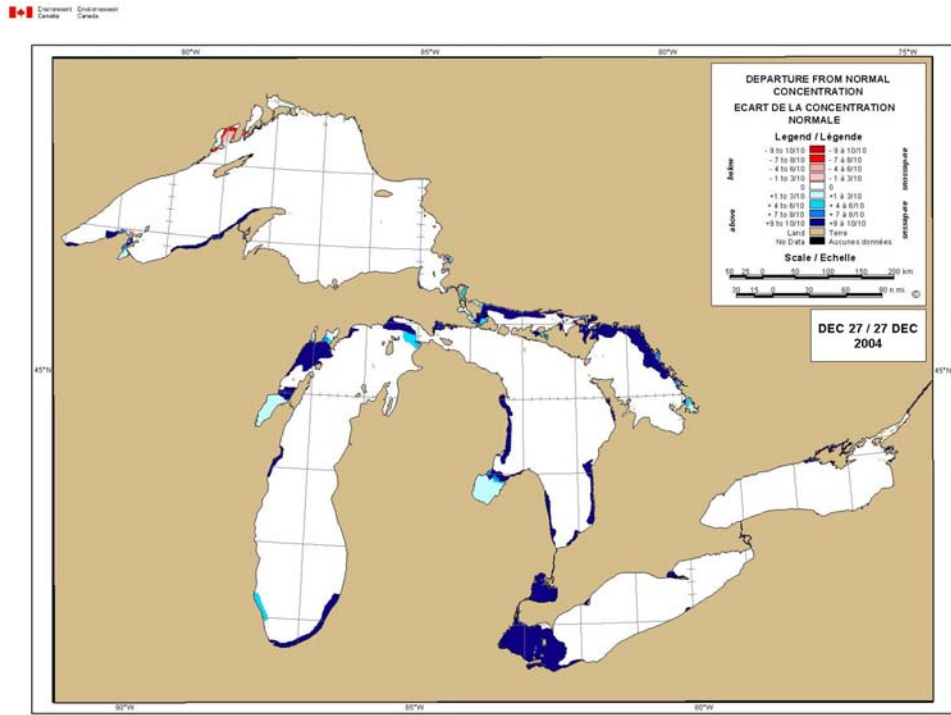
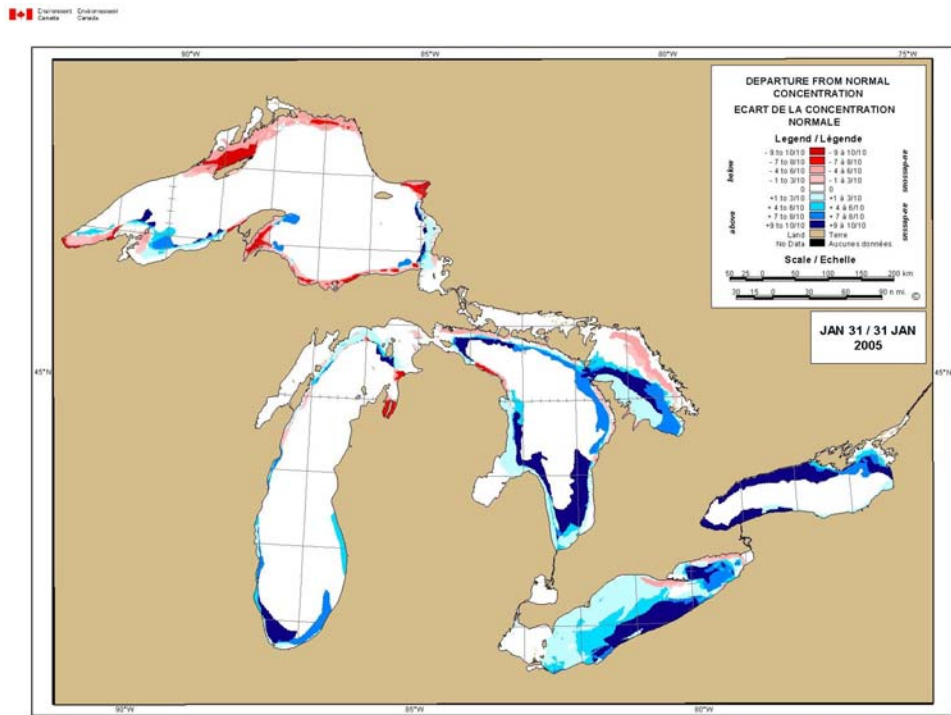


Figure 13: Normalized Ice Coverage for Lake Ontario for February 19<sup>th</sup>.



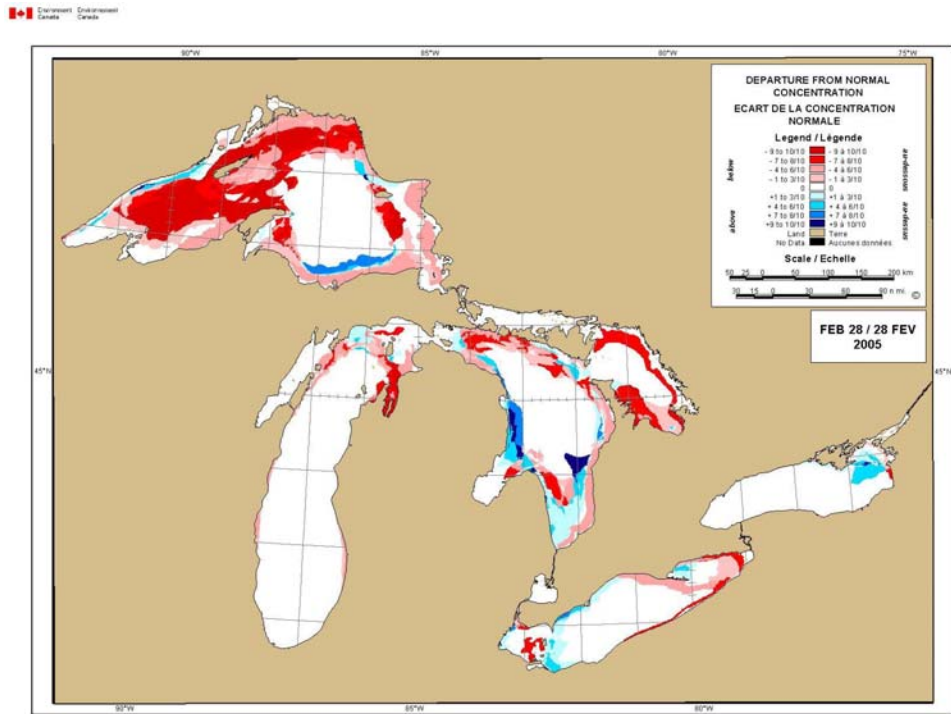
Canada

Figure 14: Departure from normal concentration – December 27<sup>th</sup>, 2004.



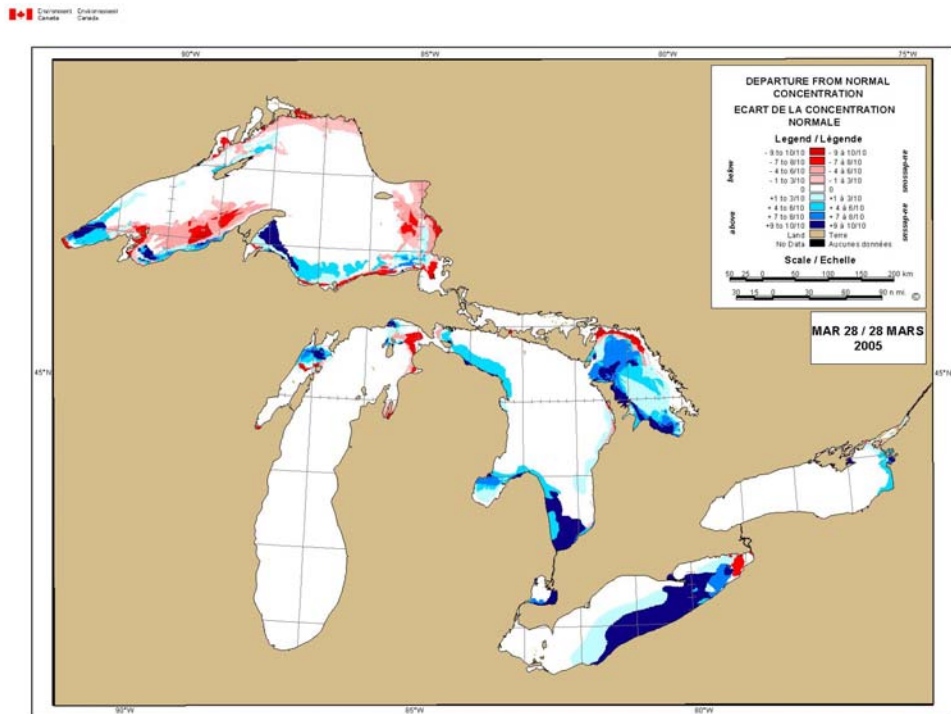
Canada

Figure 15: Departure from normal concentration – January 31<sup>st</sup>, 2005.



Canada

Figure 16: Departure from normal concentration – February 28<sup>th</sup>, 2005.



Canada

Figure 17: Departure from normal concentration – March 28<sup>th</sup>, 2005.

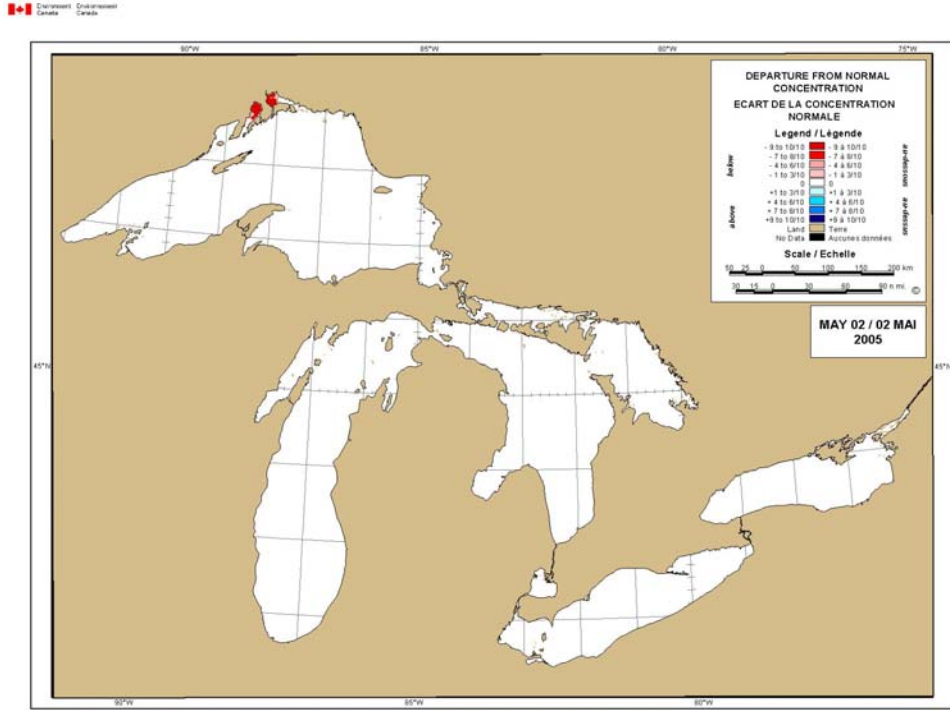


Figure 18: Departure from normal concentration – May 2<sup>nd</sup>, 2005.

Canada