Seasonal Summary

Great Lakes
Winter 2018-2019

By the North American Ice Service

Summary for the Great Lakes

The 2018-2019 Great Lakes ice season can be characterized by an early start to ice formation and an above average and consistent ice coverage. The above normal ice coverage was driven by below normal temperatures throughout much of the winter months across the Great Lakes basin. The persistent cold temperatures over the Great Lakes fostered more uniform ice formation which steadily thickened from January to March before finally starting to decline from March to May.

The 2018-2019 ice season followed the historical trend of ice growth for the Great Lakes with two exceptions**;**

1. Fast early season ice growth to late December slowed somewhat in January but continued to thicken with the cold temperatures.
2. This lead to ice coverage persisting longer in the spring than is normal, especially in the northern lakes. Ice coverage was higher than the median amount across the Lakes but the maximum ice coverage occurred near the normal time of the season.

The total accumulated ice coverage (TAC) for the past season (for the historical weeks of 4 December to 4 June) of 20.5% was similar to that of 2017-2018 of 18.6% and well above the historical median of 14.4%. The TAC this year puts the 2018/19 season at the 16th highest TAC since the 1972/73 season, putting it in the 66th percentile of historic cases.

Peak ice coverage on the Great Lakes was in the week of March 5th 2019, 1 week before the climatological normal for peak ice. The extent at that time was 73.9%, well above the climate medium of 39.8%. The maximum ice extent was the 12th highest recorded since the 1972/73 season.

Below are subdivided temperature anomaly regimes for the winter of 2018-2019 (Figures 1-8).

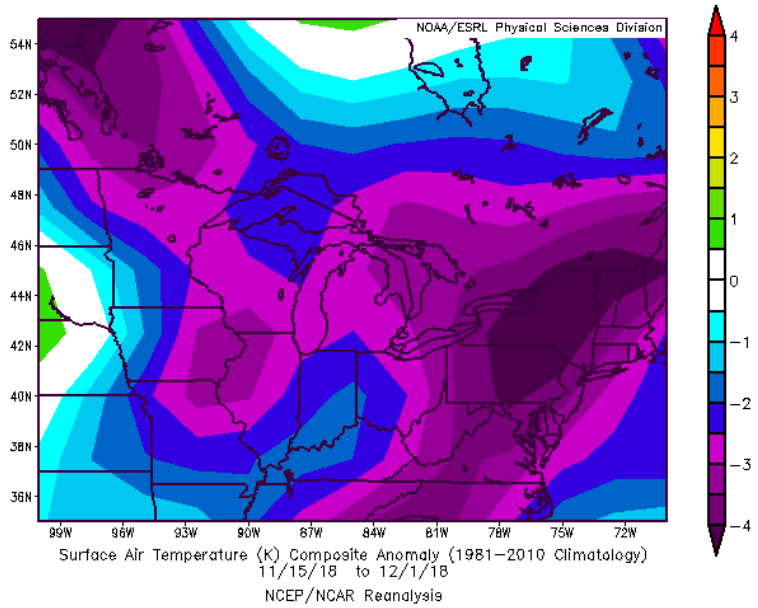

Figure 1: Surface Air Temperature Anomaly for the Great Lakes, 15 November 2018 to 1 December 2018

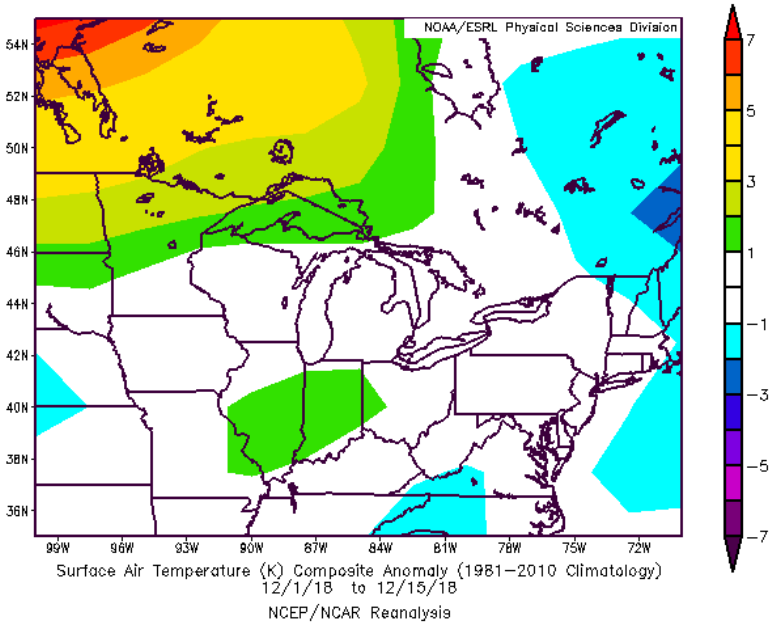

Figure 2: Surface Air Temperature Anomaly for the Great Lakes, 1 December 2018 to 15 December 2018

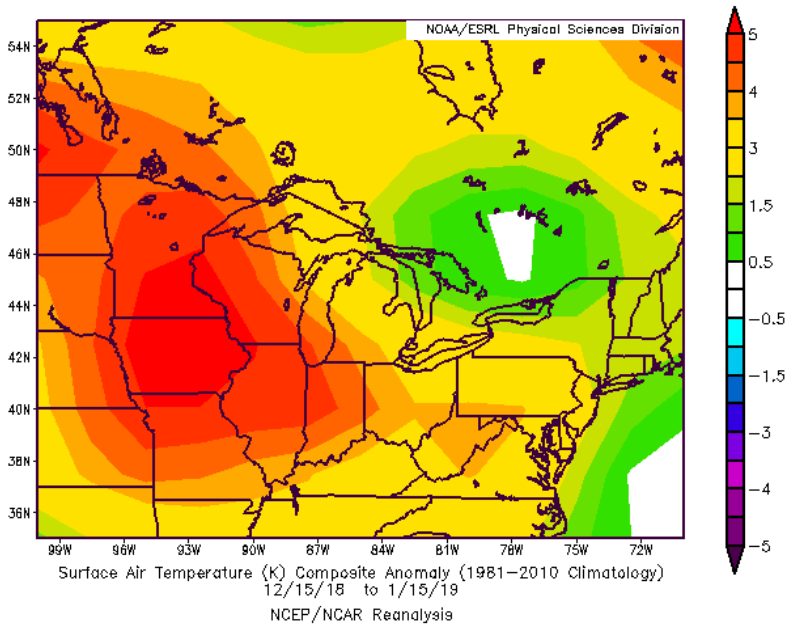

Figure 3: Surface Air Temperature Anomaly for the Great Lakes, 15 December 2018 to 15 January 2019

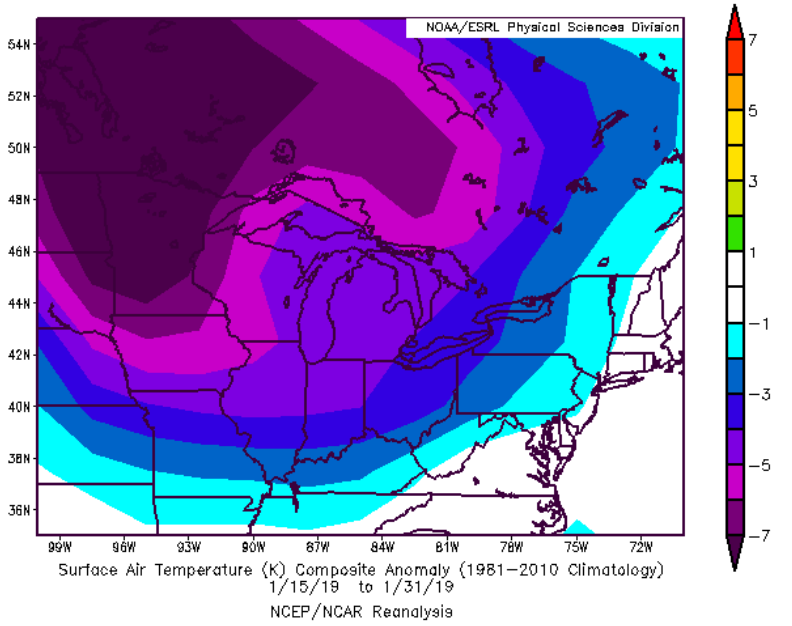

Figure 4: Surface Air Temperature Anomaly for the Great Lakes, 15 January 2019 to 31 January 2019

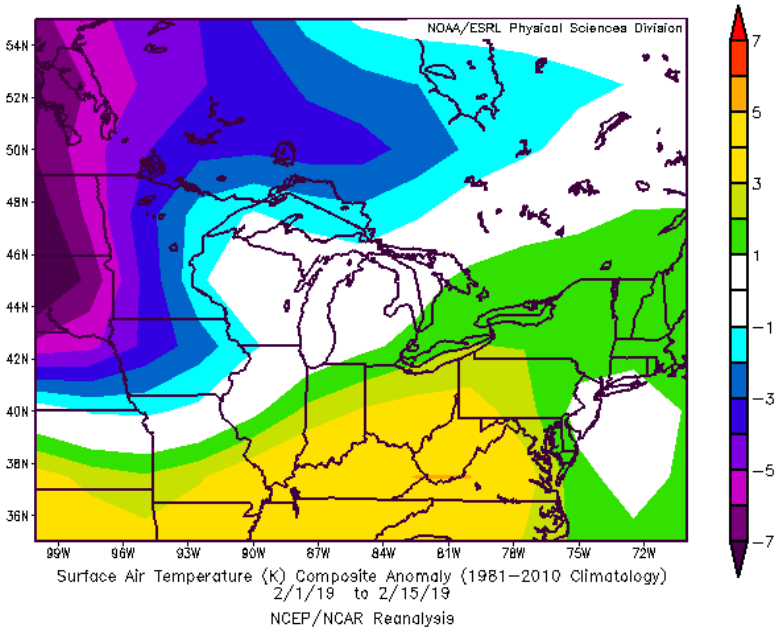

Figure 5: Surface Air Temperature Anomaly for the Great Lakes, 1 February 2019 to 15 February 2019

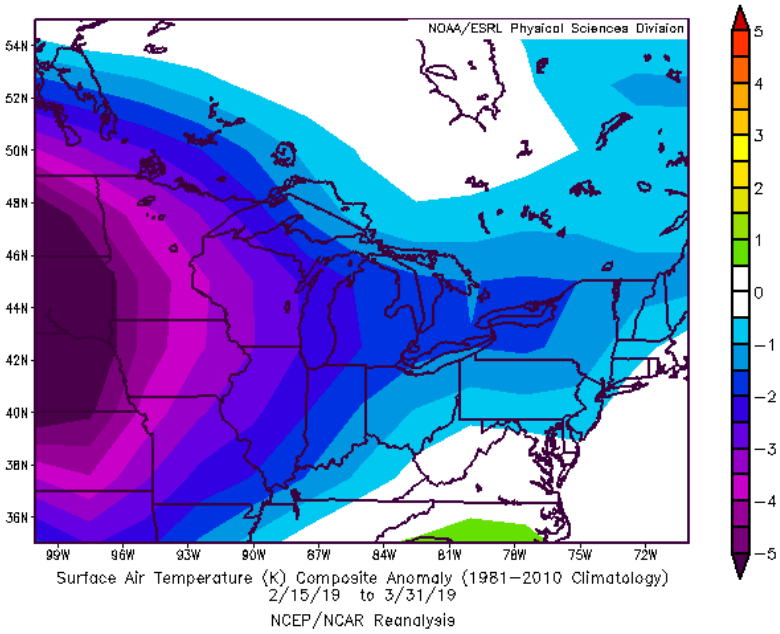

Figure 6: Surface Air Temperature Anomaly for the Great Lakes, 15 February 2019 to 31 March 2019

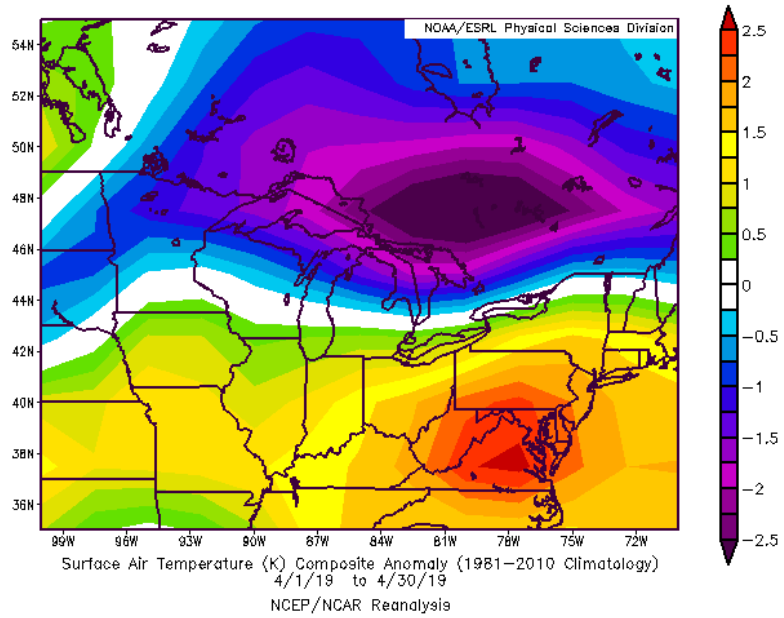

Figure 7: Surface Air Temperature Anomaly for the Great Lakes, 1 April 2019 to 30 April 2019

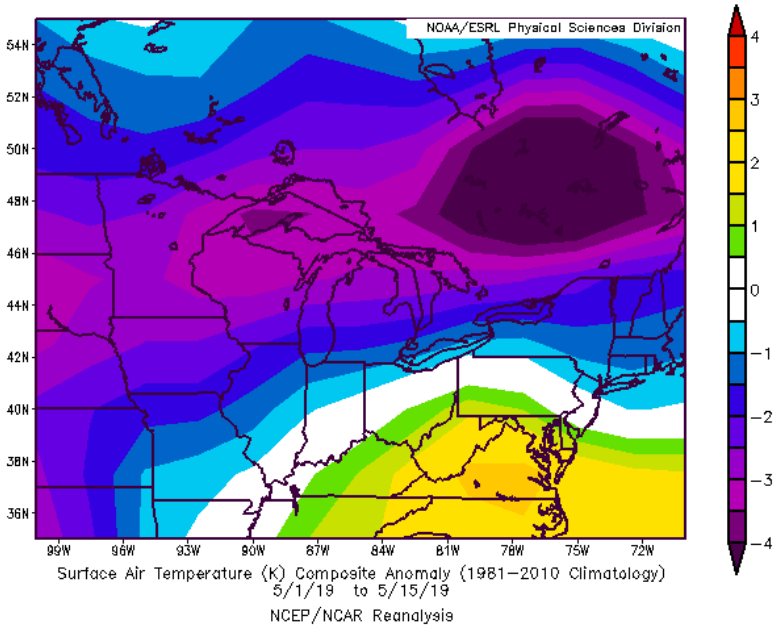

Figure 8: Surface Air Temperature Anomaly for the Great Lakes, 1 May 2019 to 15 May 2019

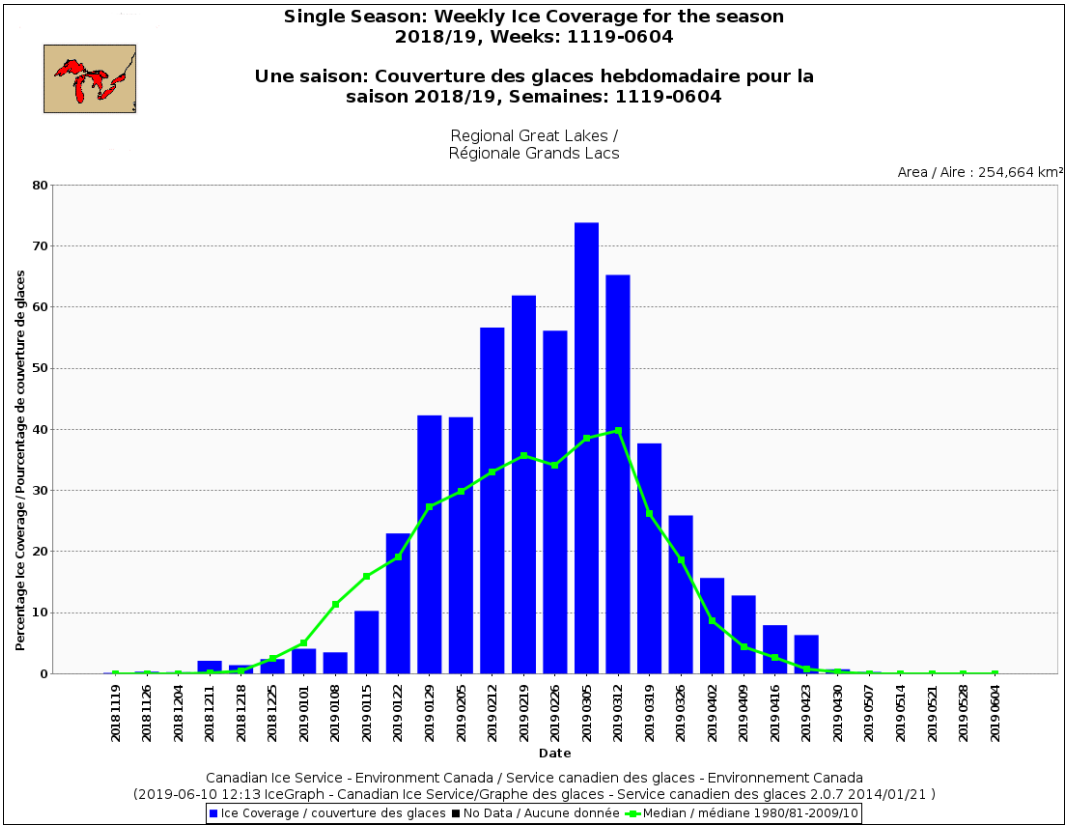

Figure 9: Weekly ice coverage for the Great Lakes, winter 2018-2019

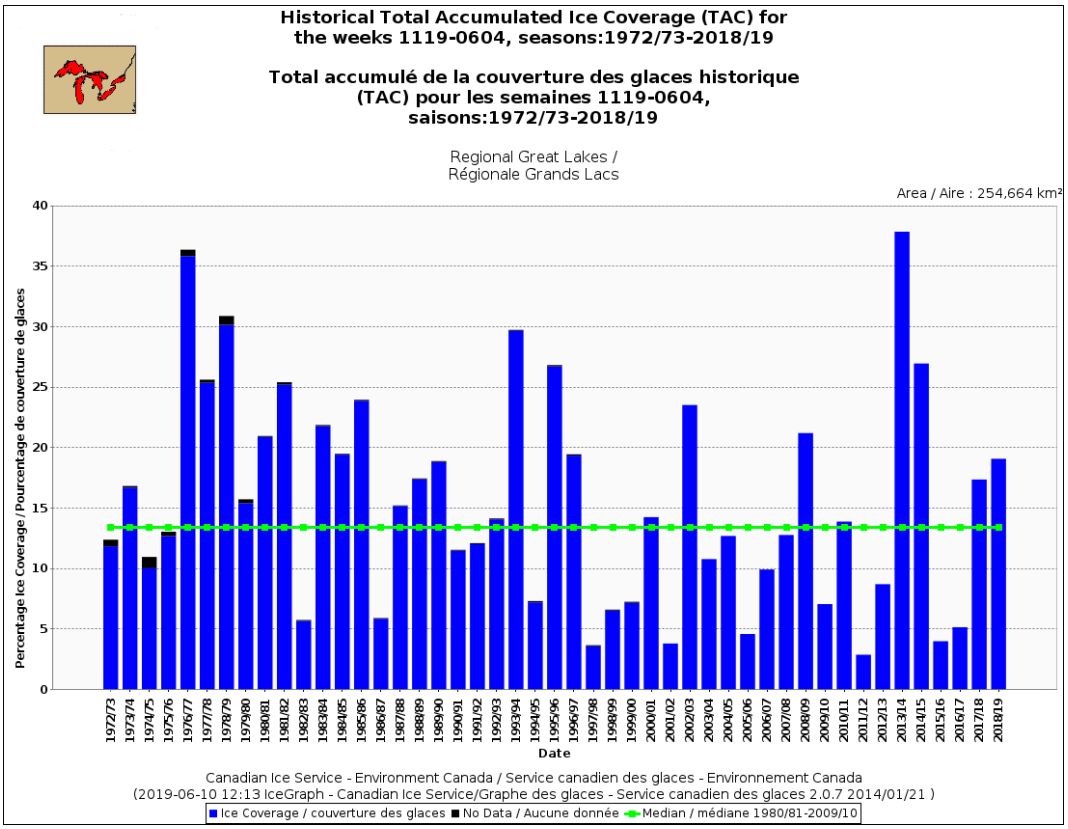

Figure 10: Historical Total Accumulated Ice Coverage on the Great Lakes, 1972-1973 to 2018-2019

Lake Superior

2018-2019 Season temperatures:

The ice season started early with temperatures 2-3 degrees Celsius below normal from mid-November to early December. Milder temperatures moved across the lake in early December with temperatures slightly above normal. The magnitude of the above normal temperatures increased by mid-December. From mid-December to mid-January, temperatures ranged from 3 degrees Celsius above normal in the east to 5 degrees Celsius above normal in the west. A large shift in atmospheric patterns put an abrupt end to this short-lived mild trend and brought intense cold temperatures across Lake Superior in mid-January. Through the end of the month, temperatures were 6-7 degrees Celsius below normal in the western portion of the lake to 5 degrees Celsius below normal in the eastern portion of the lake. By February, temperatures returned to near normal value for the first half of the month. From mid-February to the end of March, temperatures were generally below normal. The largest deviation from normal was near Duluth with temperatures near 3 degrees Celsius below normal. Eastern lake Superior saw temperatures near 1 degree below normal. The spring months of April and May saw continued below normal temperatures of 1-3 degrees Celsius.

2018-2019 Ice conditions:

The cold temperatures that swept across Lake Superior in mid-November saw the first ice forming in Black Bay and Nipigon Bay in mid-November; earlier than is usual for the area. Because the cold temperatures did not persist through December the ice that had formed thickened slowly but very little new ice was formed across the lake until the return of colder temperatures in the second week of December. In the second week ice formed near the Apostle Islands, within the Keweenaw Peninsula, and in Chequamegon Bay. A few patches of new and thin lake ice were present in Whitefish Bay. By the end of December, ice fell below the climate median with ice coverage nearly unchanged from earlier in the month. The thickest ice present was medium land fast ice within the northern Bays of the lake. With continued above normal temperatures, there was little increase in ice extent and thickness. Between early December and mid-January ice coverage on the lake remained between

1.2% and 3.5%. The climatological normal for that time period shows an increase from 0.2% covered in early December to 6.1% covered by the 8th of January.

An abrupt change in the weather occurred in the second week of January which ushered in temperatures that were well below seasonal normal. These cold temperatures were in stark contrast to the previous month, especially for the western lake, where temperatures of 4 degrees Celsius above normal were replaced with temperatures 6-7 degrees Celsius below normal for the second half of January. Ice formation drastically accelerated in the second half of the month with these persistent colder than average temperatures. By the 22nd of January ice coverage increased dramatically erasing the ice deficit over the area and attaining a near climate median value of 14.6% (climate median 16%). Ice growth occurred along the entire coastline of the lake. Whitefish and Thunder Bays completely filled with thin lake ice. The first thick lake ice of the season formed as the medium lake ice present early in the month thickened to thick in Black bay, Nipigon Bay, and Chequamegon Bay. The following week saw continued ice growth with 9-10 tenths of new and thin lake ice present along the entire shore of the lake. Ice became fast in Whitefish and Thunder Bays. Ice cover on the lake surged above the median value. By the 28th of January ice cover was 37.8%, over double the climate median for that week and an increase of over 34% from what it had been at the beginning of January.

The first half of February saw continued and steady ice growth, although slower than it had been at the end of January. Although coverage only increased 5% in the first week of February, the thickness of the ice on the lake increased. The predominant ice cover across much of the lake in the first week increased to medium lake ice, the second week of February saw this steady increase continue. By 11th February, ice was now present across the entire western half of the lake with the only open water present in the offshore area of the eastern part of the lake. Unusually, a large region of land fast medium lake ice formed near Duluth during this time. Ice cover by mid-February was at 71.4%, almost 50% more ice coverage than the climate median of 22.8% Cooler temperatures in late February and March continued the gradual upward march of ice coverage. The third week of February saw the first very thick lake ice form in Black Bay. The peak ice conditions of 93.3% occurred on the week of March 4th 2019 which is one week ahead of the climate normal date for peak ice conditions. This lands 2018-2019 as the ninth highest maximum ice coverage recorded since the 1972/73 season. This is above the median

value of 71.9%. The following week saw a slight decline in ice coverage, mainly due to northwesterly flow opening up some open water areas along the north shore, southeast of the Keweenaw Peninsula, and southeast of the Apostle Islands. This northwesterly flow also packed a significant area of thick lake ice along the Keweenaw Peninsula.

The third week of March saw temperatures closer to normal across the region. Ice cover decreased steadily however stayed well above the climate median. By the 25th of March ice cover was down to 38.7%. The main losses of lake ice were in the northern half of the lake. Rare fast ice was still present near Duluth, with a very close pack of thick lake ice still present along the Keweenaw Peninsula. Overall, much of the ice on the lake was of medium and thick lake ice by this point of the year.

Steadily below normal temperatures kept ice coverage amounts above normal through the end of the season. By April 1, the land fast ice near Duluth fractured and the Whitefish Bay fast ice started to fracture. Ice coverage at higher concentrations than normal declined (or melted) at a rate comparable to the climate median rate over the next two weeks. The next two weeks saw a gradual deterioration of the ice cover. Thunder Bay, Chequamegon Bay, and Whitefish Bay land fast ice fractured during this time. Much of the ice present at the extreme western edge of the lake melted out.

The last of the significant ice in the southeastern lake was lost between the 22nd and 29th of April. A few patches of ice were still present along some coastal areas as well as in the three northern Bays at the end of April.

As is the case most years, the last ice in the Lake Superior was present in Black Bay and Nipigon Bay. That ice fractured and melted in the first 2 weeks of the month. By the 16th of May all ice on Lake Superior had melted, bringing an end to the ice season.

The TAC for the season was 27.1%, very similar to that of last season and well above the historical median of 16.2%. This puts the ice season for Lake Superior as the 14th highest TAC since the 1972/73 season.

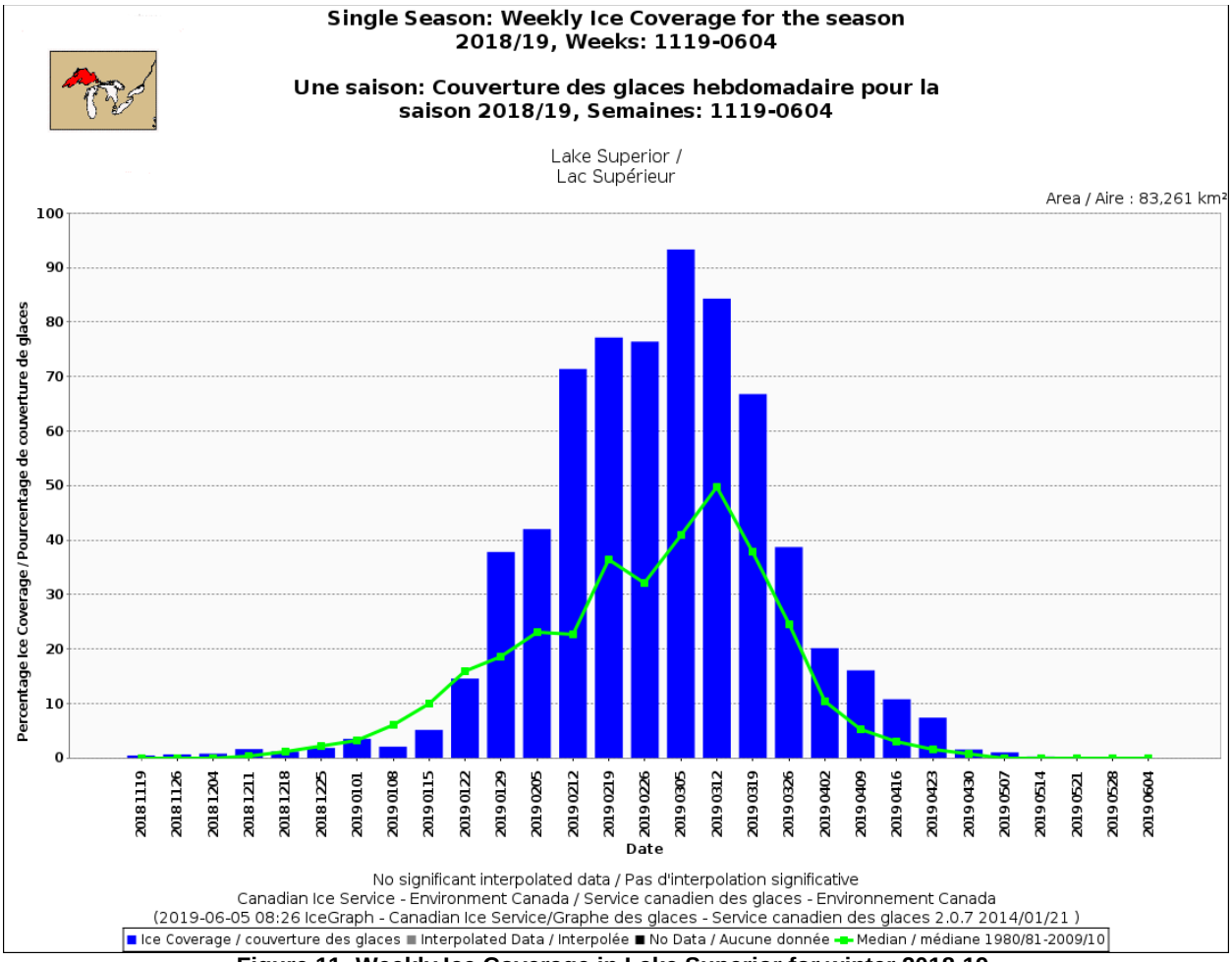

Figure 11: Weekly Ice Coverage in Lake Superior for winter 2018-19.

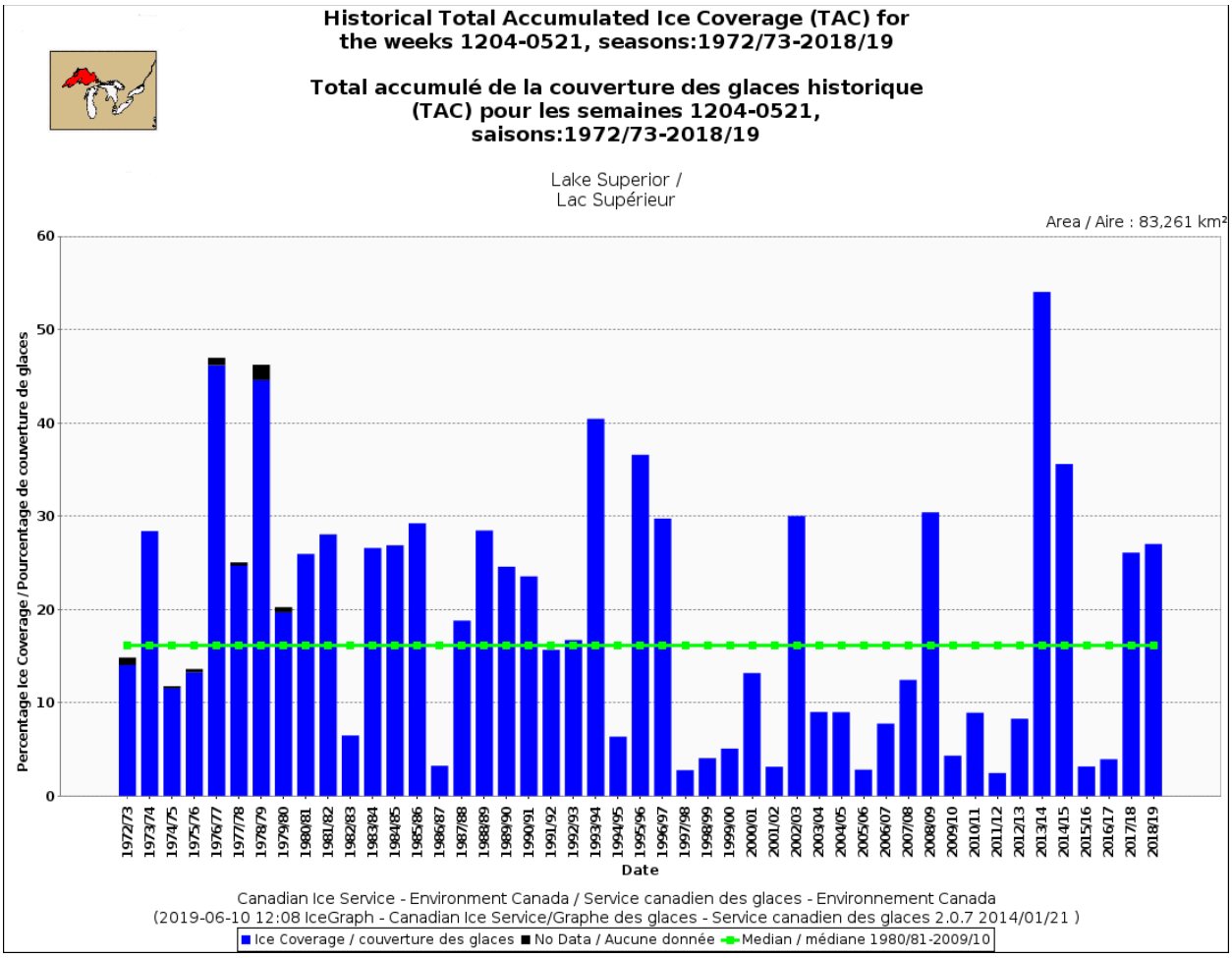

Figure 12: Historical Total Accumulated Ice Coverage in Lake Superior by season, 1972-2019.

Lake Michigan

2018-2019 Season temperatures:

Unseasonably cold temperature in late November turned to above normal temperatures from early December through mid-January. Temperatures were up to 5 degrees Celsius warmer than normal in southwestern Lake Michigan with temperatures closer to 3 degrees Celsius warmer than normal in northeastern areas of the Lake. From December 10 to January 15, Green Bay accumulated only 80 FDD. Usually during this period, Green Bay usually sees an accumulation of 200 FDDs. During the same period, Chicago saw no accumulation of FDDs. Usually it would expect see 130 FDD accumulated during this time.

An arctic air mass settled over the lake in mid-January. Temperatures plummeted to 5 degrees Celsius below normal through the

end of the month. Some warming occurred after January with near normal temperatures during the first 2 weeks of February. Steadily below normal temperatures persisted from mid-February to the end of March. Temperatures during that time were generally near 2 degrees Celsius below normal.

April ushered in a distinct two-zone temperature regime for the lake with the northern half of the lake seeing cold temperatures ranging from 1-2 degrees Celsius below normal while the southern portion of the lake saw temperatures slightly above normal during the same time.

2018-2019 Ice conditions:

The Lake Michigan ice season started much earlier than normal in the 2018-2019 season as small amounts of ice formed at the northern shore of the Bays de Noc in late November, well ahead of the climate normal date of ice formation of mid-December. This was mainly due to abnormally cold temperatures in late November. However, because of the overall warming of temperatures in early December little further ice development occurred until the second week of December. Ice started to form in southern Green Bay and in the extreme northern section, mainly new and thin lake ice.

By the end of December, the lake was 3% covered with ice, very similar to the climate median for that date. Ice had started to form along the northeastern shore and in the Straits of Mackinac. Ice in southern and northern Green Bay continued to be mainly new and thin lake ice.

The first 2 weeks of January saw warmer than normal temperatures continuing with little change in ice thickness or extent. Ice cover remained between 2.7-3% until the second week of the month, falling below the climate median. The week of the 8th of January saw ice cover of 2.7%, well below the median of 10.4% from the historical data.

Cold temperatures swept across the Lake in the second week of January bringing a rapid expansion and thickening of ice. By the 14th of January the ice in the northern Bays de Noc and in the extreme southern section of Green Bay had become land fast with thin and medium lake ice. Ice was present along the entire northern shore of the lake, in Green Bay, and in the Straits of Mackinac. Cold temperatures continued and by the third week of the month, ice was present along the entire shoreline of the lake. The northeastern section of the lake was fully covered by thin lake ice. Green Bay was fully ice covered with thin and medium lake ice.

The end of January saw continued increase in both ice extent and thickness. By the 28th of January ice coverage was up to 29.1%, almost 10% above the historical median. Ice in the Straits of Mackinac and in southern Green Bay became fast before the end of the month.

More seasonal temperatures spread across the Lake in the first 2 weeks of February. Ice coverage decreased slightly during this time, remaining above the climate median, as some of the thinner ice that was present along parts of the shore was destroyed. The remaining mobile ice in Green Bay became fully land fast during this time. Some thick first-year ice was present within the fast ice in Green Bay

The usual peak of ice cover in Lake Michigan is around the 19th of February. The return of cooler temperatures did coincide with this time of the season however the cooler than normal weather continued through early March. The peak of ice cover in 2018-2019 occurred 2 weeks later than normal in the week of March 4th, 2019. Ice cover peaked at 40.4%, the 16th highest coverage since 1972-73, near 9% higher than the median of 31% and very similar to the previous years' ice coverage maximum of 38%.

The decline of lake ice on the Lake began after the 4th of March. The following week saw ice along the western shore destroyed in generally northwesterly winds. Some open water regions developed along the north shore due to these same winds.

Lake ice declined at the same rate as the historical median through the month of March and April however amounts of ice remaining roughly 3-5% above the climate median. By the 25th of March the only ice remaining in the southern section of the lake was near and south of Muskegon, Michigan. By the end of the month that ice had completely melted out. Between the 25th of March and the start of April the slow erosion of the ice in the northern part of the lake began. The northern section of Green Bay fractured during that time and some of the fast ice west of the Straits of Mackinac became unfast.

April's below normal temperatures were not enough to stop the progression of spring ice melt in the northern half of the lake. In the first week of the month much of the rest of Green Bay became unfast. Between the 8th and the 15th of April most of the remaining ice in the Lake melted in situ. On the 15th only a few small areas of low concentration rotten lake ice remained. By the end of the month all remaining ice was gone from the lake. The last ice remaining was near Little Traverse Bay and in the northern Bays de Noc, which melted before the 29th of April, roughly 1 week later than the climate median.

The TAC for the 2018-2019 season was 12.2%, above the 10.6% the season before, and above the historical median of 9.2%. This puts the season 2018-2019 as the 16th highest TAC since the 1972/73 year.

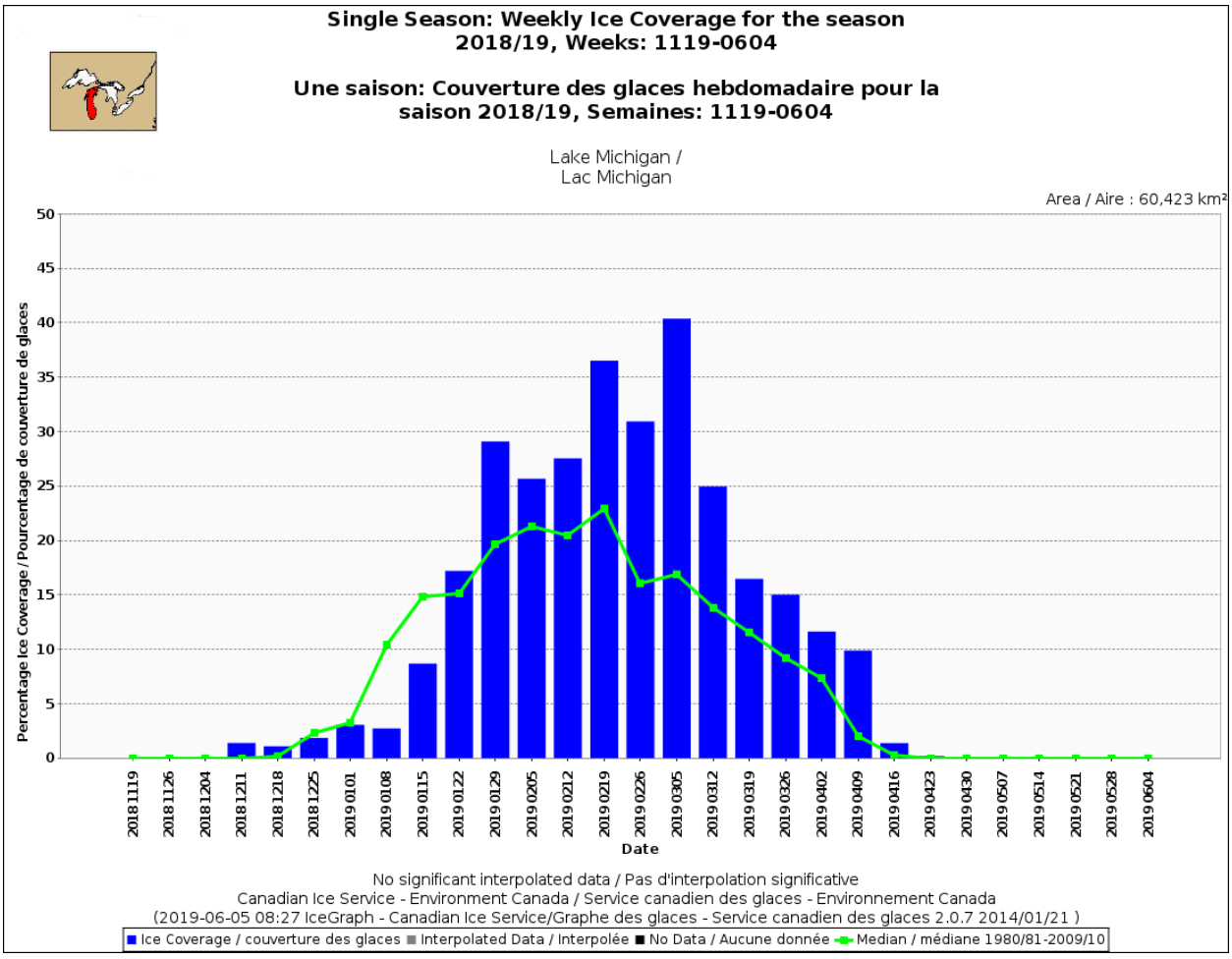

Figure 23: Weekly Ice Coverage in Lake Michigan for winter 2018-19.

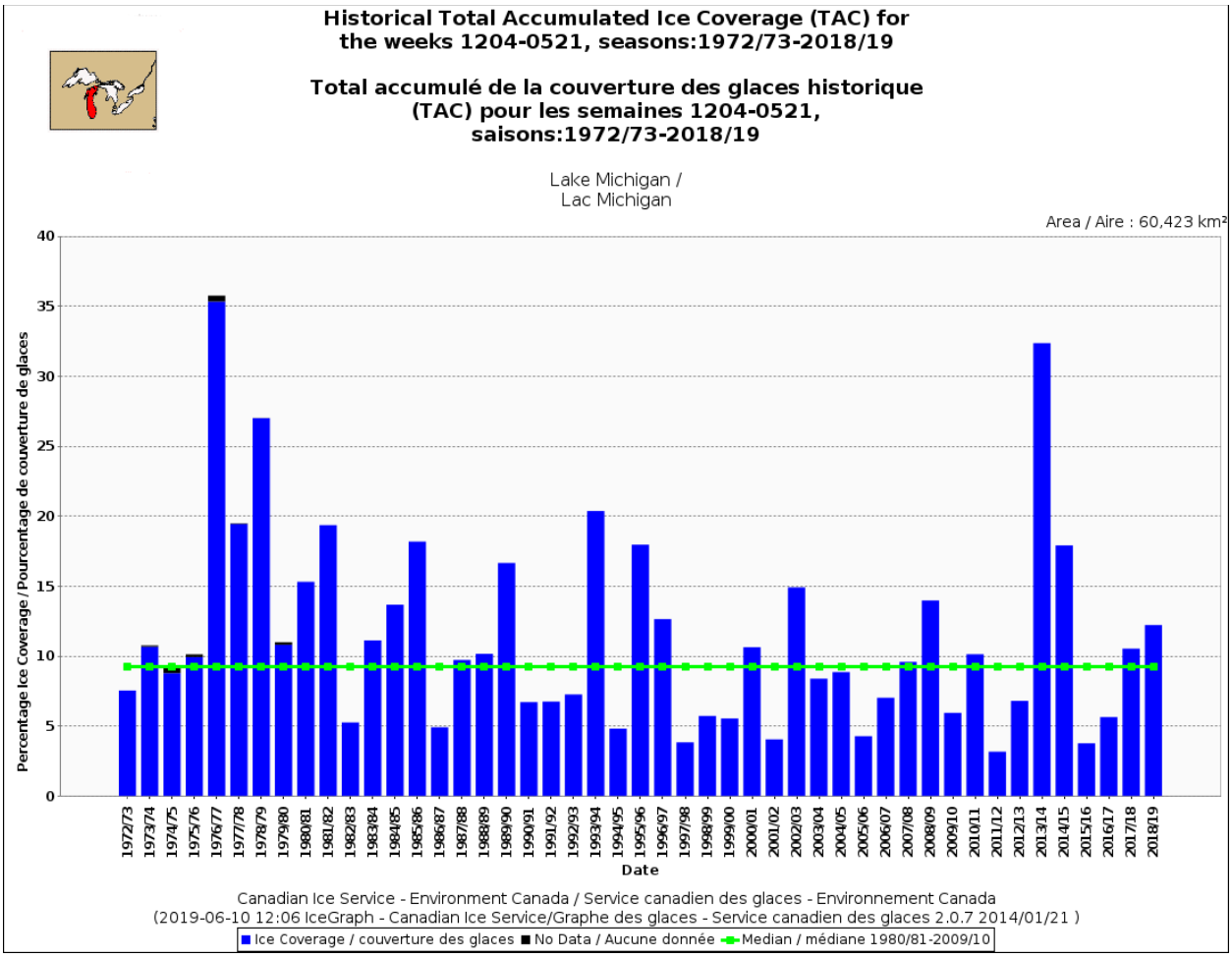

Figure 14: Historical Total Accumulated Ice Coverage in Lake Michigan by season, 1972-2019.

Lake Huron

2018-2019 Season temperatures:

Much like the entire Great Lakes Basin, Lake Huron saw well below normal temperatures envelop the region starting in mid-November. The last 2 weeks of November saw temperatures 3 degrees Celsius cooler than normal. Temperatures moderated in early December with above normal temperatures from mid-December until mid-January. Temperatures were near 3 degrees Celsius warmer than normal in the southwestern portion of the Lake while Georgian Bay and the northeastern section saw temperatures closer to 1 degree above normal.

An arctic air mass settled over the lake in mid-January. A large swing toward colder than normal temperatures occurred during the last 2 weeks

of the month. Temperatures were near 4 degrees Celsius colder than normal during this timeframe.

Early February saw a return to normal temperatures over the lake. From mid-February to the end of April below normal temperatures returned over the lake after a brief reprieve. Temperatures were 1-2 degrees Celsius colder than normal during this time.

2018-2019 Ice conditions:

The ice season on Lake Huron started with cold temperatures in mid-November forming some new lake ice in the St. Mary's river roughly one month earlier than is normal for the first ice formation, usually mid-December. Little change in the ice extent occurred in late November and early December as temperatures moderated to seasonally normal temperatures.

The second week of December saw the first ice growth outside of the St. Mary's river. By the 10th of December new and thin lake ice started to form in much of Saginaw bay, in parts of the North Channel along the shore, and along the northeast shore of Georgian Bay. Above normal temperatures in the last few weeks of December saw little ice extent growth. Fast ice began to develop in the St. Mary's river and in a few bays of the eastern section of the North Channel.

Some slight increase in ice amounts, still along the shore in the northern section of the lake, through the first week of January.

An arctic air mass swept across the Lake in the second week of January and with it a rapid development of the ice occurred. Between the first and second week of January ice grew to cover the entire North Channel with thin and medium lake ice. Georgian Bay had new and thin lake ice form across the northeastern section. The shore along the entire lake had some ice form during that time due to well below normal temperatures. Ice cover on the 8th of January was half of the historical median, at 8.4%. Ice cover jumped to 23.6% the week of the 15th after the arrival of the cold arctic air mass.

The cold temperatures persisted through the end of January with ice cover increasing to 37.2% on the week of January 22nd, 9% above the climate normal. The main increases in ice during that time were along the shore with ice increasing in both extent and thickness. The predominant

ice type along the shores was thin lake ice. The North Channel and St. Mary's river saw ice thicken to medium lake ice during this time.

By the end of January the ice in the North Channel, Saginaw Bay, and near the Straits of Mackinac became fast. Ice continued to increase in extent. The St. Mary's river thickened to thick lake ice before the end of the month.

A brief reprieve from below normal temperatures occurred in the first two weeks of February with near normal temperatures during that time. The ice extent slightly decreased during the first week of the month while still remaining above the historical median ice coverage.

Below normal temperatures returned in the latter half of February, promoting continued ice growth. By the 18th of February, Georgian Bay was completely ice covered with thin and medium lake ice. The central portion of Lake Huron was the only section of the lake without ice.

Peak ice conditions on Lake Huron occurred on the week of March 4th, 2019 at 88.3%, the 11th highest ice extent since the 1972-73 ice season. Usually Lake Huron sees its first peak ice conditions around February 19th and a second peak near March 12th. On the week of March 4th there was only a small section of ice in the centre of the lake that remained open water. The majority of the lake was covered in thin and medium lake ice. Thick lake ice was present within the fast ice across much of the lake. A similar ice extent continued through the 11th of March. Some coastal leads developed along the western shore of the lake and western shore of Georgian Bay in a generally northwesterly flow over that time. Ice thickened, especially along the eastern shore of the lake, to medium lake ice.

Significant ice melt and destruction occurred between the 11th and 18th of March. Much of the ice through the centre of the lake melted during that week. The main mobile ice on the lake was present along the eastern shore, compressed as medium lake ice. Saginaw Bay fast ice became mobile. Georgian Bay saw the mobile ice pack thin from fully covered to near 50% ice covered.

Little change in ice cover occurred before the end of the month of March. By early April, Saginaw Bay completely melted out. The Georgian Bay mobile ice diminished and drifted to the southeastern portion of the bay. By the week of April 8th ice cover had fallen to 17.6 % ice covered, above the median for that date of 10%. Ice fractured in the Straits of Mackinac in the first week of the month. In the week of the 8th some ice remained against the eastern shore of the lake and in eastern Georgian Bay, as well as fast ice remaining in the North Channel.

Ice concentration continued to diminish gradually in the second week of April. By mid-month little ice remained in the northwest of the lake, the St. Mary's river had started to unfast, and erosion of the fast ice in the North Channel had begun. The fast ice along the shore of Georgian Bay saw significant reduction in extent but did not fully fracture.

The last week of April saw a rapid melt and diminishing of the ice in Lake Huron. Between April 22nd and April 29th the full fracture and melt of the ice in the North Channel and Georgian Bay occurred. At the end of April only a few small pockets of ice remained in the North Channel, quickly melting before the onset of May.

The TAC for Lake Huron for the 2018-2019 ice season was 27% which is higher than the historical median of 21.3%. This value puts the Lake Huron ice season at the 14th highest TAC value since the 1972-73 season.

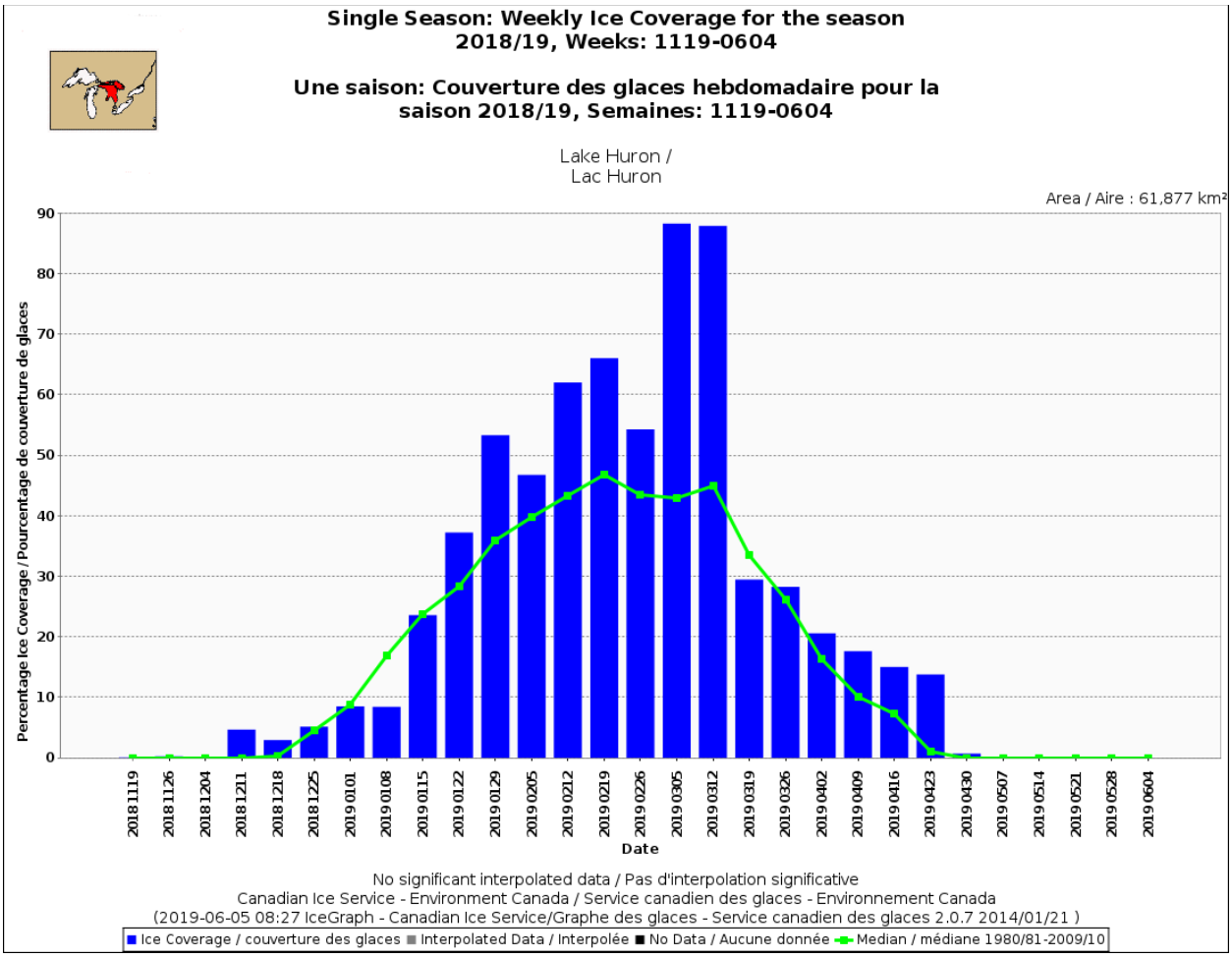

Figure 35: Weekly Ice Coverage in Lake Huron for winter 2018-19.

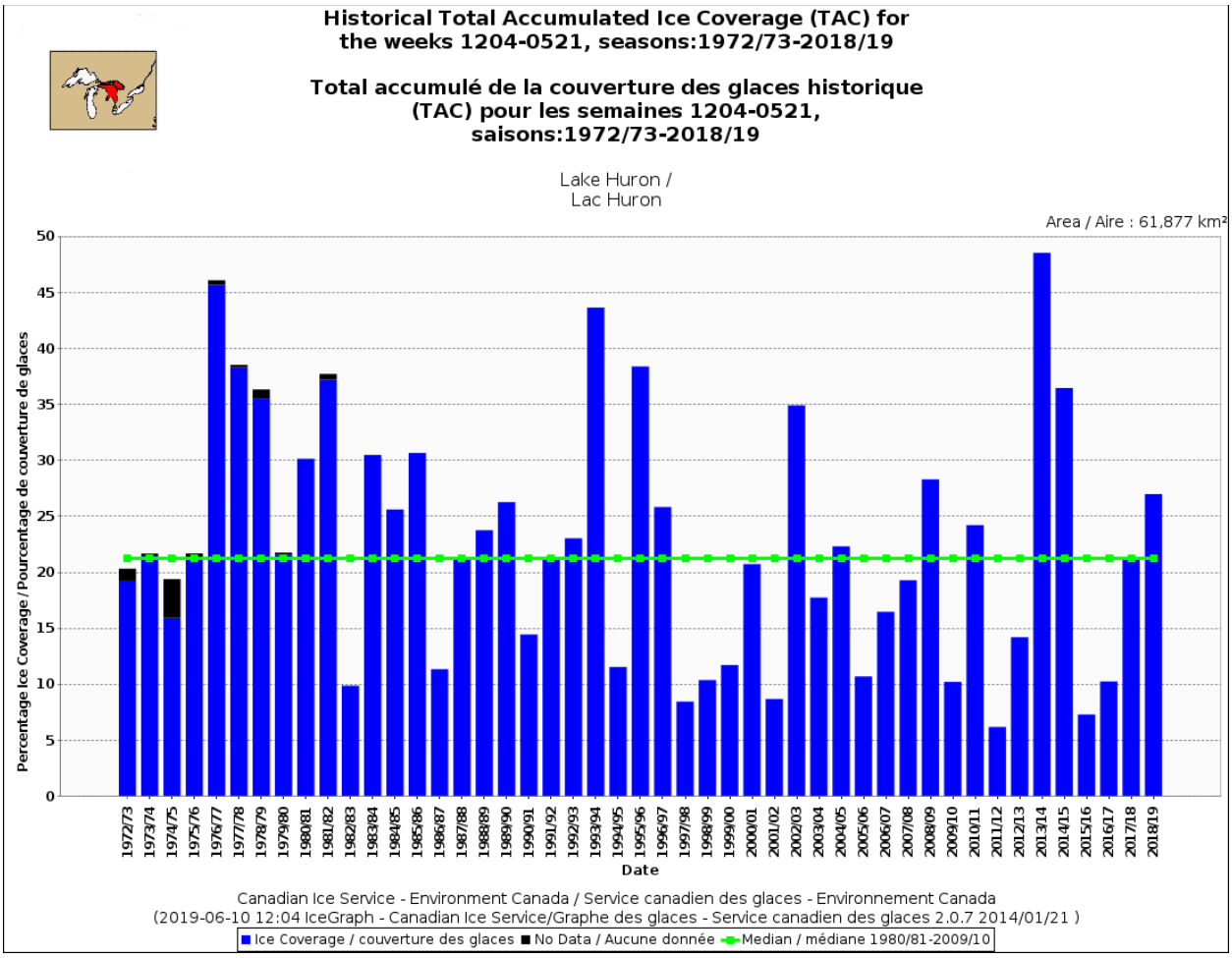

Figure 46: Historical Total Accumulated Ice Coverage in Lake Huron by season, 1972-2019.

Lake Erie

2018-2019 Season temperatures:

Lake Erie saw the most fluctuating temperatures across the Great Lakes during the winter months. The early season (November) temperatures had no impact on early ice formation on Lake Erie compared to the other Great Lakes. Following early season cold temperatures, a period of near normal temperatures occurred in early December.

Temperatures near 3 degrees Celsius above normal persisted from mid-December to mid-January. There was little to no accumulation of Freezing Degree Days (FDD) across most of the lake until January 10th. By mid-January most locations were near 100 FDD lower than the historical normal.

A frigid arctic air mass moved swiftly over the region in mid-January flipping the temperature trend drastically. Temperatures across the lake were 3 degrees Celsius below normal during this time period.

Early February warmed with temperatures of 1-3 degrees Celsius above normal for the lake, with the 3 degree above normal temperatures on the southern shore of the lake and the 1 degree above normal temperatures to the north.

A return of cold air in mid-February lasted until the end of March. Temperatures during the period hovered near 1-2 degrees Celsius below normal.

Another reversal in the weather pattern in April brought a return to above normal temperatures by up to 1 degree Celsius.

2018-2019 Ice conditions:

Unlike all of the other Great Lakes, Lake Erie did not see any ice growth in the early season (November) under the frigid air mass that moved across the region. In fact, due to the above normal temperatures which followed through December and early January ice growth was delayed on Lake Erie.

The first ice of the year appeared just before mid-month in January. New lake ice formed across part of Lake St. Clair and in Long Point Bay. By the third week of January there was full ice cover across the Western Basin of Lake Erie and Lake St. Clair. The majority of the ice was still of new lake ice thickness with some thin lake ice. The shores of Lake Erie produced ice rapidly, seeing full cover along the shores by the 21st of January. The cold temperatures and rapid ice growth saw ice coverage jump from 3% on the 15th of January to 36% ice covered in the week of January 22nd, 1% above the climate normal for that week.

The last 2 weeks of January saw ice continue to grow. There was a doubling of the ice cover between January 21 and 28, from 36% covered to 74% covered. Only two small patches of open water remained: one in the centre of the lake and one in the eastern section. Ice thickened in parts of Lake St. Clair and near Point Pelee to medium lake ice.

Late-January and early February saw the first fast-ice in the Western Basin, Lake St. Clair, and Long Point Bay. The fast ice was of medium lake ice thickness. Other than a small coastal lead along the south shore of the

lake, much of the water of the lake was covered by new and thin lake ice by the 4th of February, with ice cover of 84%.

Usually the peak ice coverage on Lake Erie is the week of February 12th. There was an initial peak on this week in the 2018-2019 season of 89.2% however this was not the maximum ice extent for the season. A few coastal leads were what accounted for the 10.8% of opening water still present. Ice thickened to medium lake ice across most of the lake. Fast ice formed near Buffalo while at the same time the fast ice in the Western Basin and in southern Lake St. Clair fractured. Mid-February to early March saw conditions remain similar across the lake with slow thickening of ice.

The first week of March saw the peak of ice cover on Lake Erie for the season. Ice coverage peaked at 95% on the week of March 5th 2019. This is equal to the normal maximum for the lake and similar to the 2017-2018 season. The Difference in this season is that the peak was 4 weeks later than the normal peak. The value was 30% higher than the climate median for ice coverage on the week of March 5th. The later peak can be explained by the below normal temperatures that were persistent from mid-February to the end of March.

The decline of lake ice began slowly in the second week of March with the melt and opening of some of the ice in Lake St. Clair and in the Western Basin. The ice remaining in the eastern half of the Lake tended to be thicker and more compressed than usual at this time of year. By the 18th of March only patches of lake ice remained in the Western Basin, in Lake St. Clair, and in the western half of the lake. Ice cover dropped by more than half between the week of the 12th of March and 19th of March from 84.9% to 36.3%.

Ice continued to melt through the end of March. By the 25th, only a small sliver of ice remained in the western half of the lake near Point Pelee. At the same time, the extreme eastern end of Lake Erie was unusually still land fast near Buffalo with a very close pack of mobile ice abutting the fast ice with up to 2 tenths of thick lake ice. The ice in the eastern end of the lake kept the ice cover above the climate median through the month of April.

The fast ice remained in place near Buffalo through the first week of April before fracturing in the second week. The very close pack of ice in the extreme eastern end of the lake remained steadfast until the last week of the month. The final strip of ice remaining on the lake melted in the first week of May, roughly 3 weeks later than normal.

The TAC for the 2018-19 season shows a slightly above normal TAC of 28.8%, above the median of 26%. This puts the 2018-19 season as the 21st highest TAC since the 1972-73 season. This is slightly below the 30.3% TAC during the 2017-18 season.

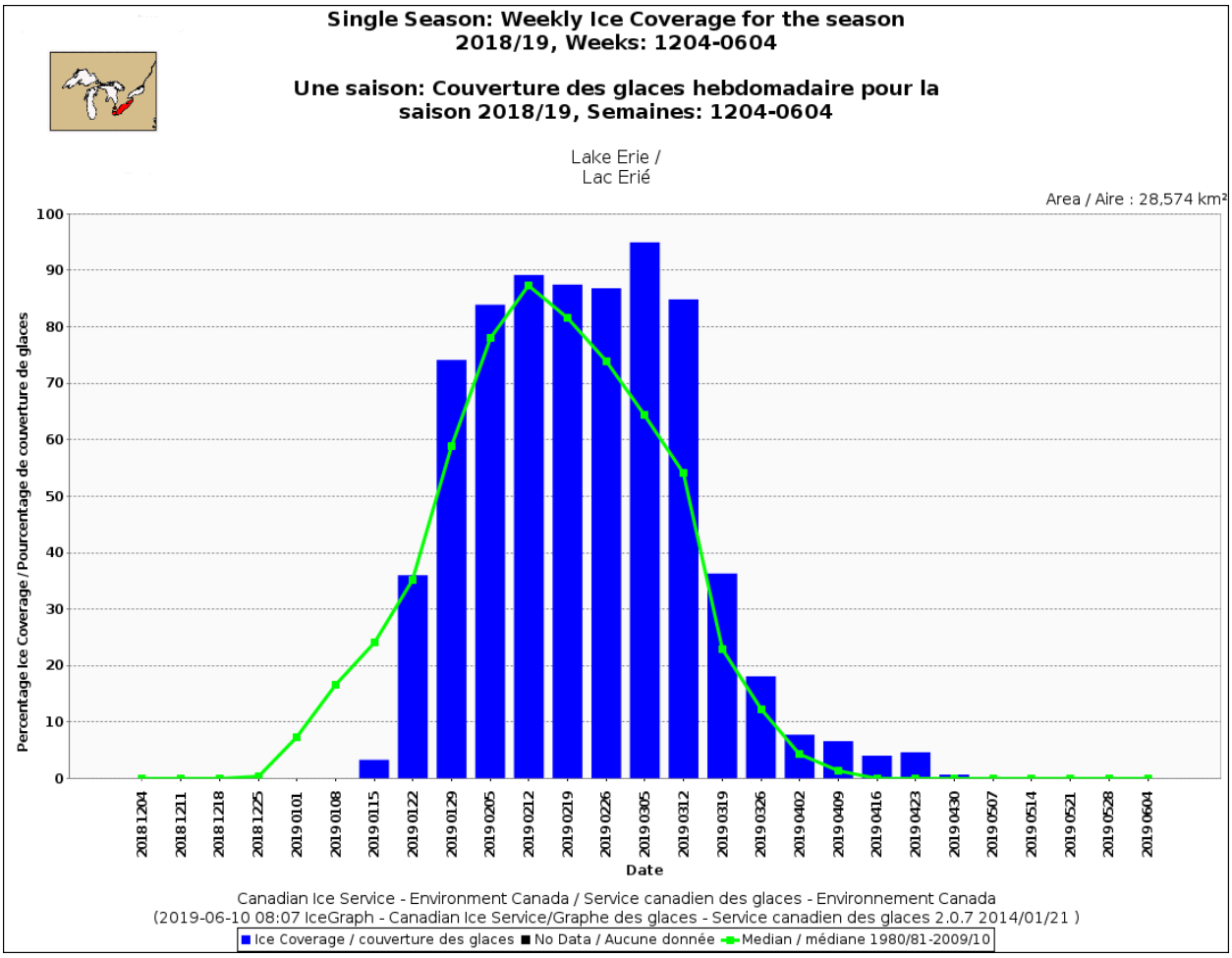

Figure 57: Weekly Ice Coverage in Lake Erie for winter 2018-19.

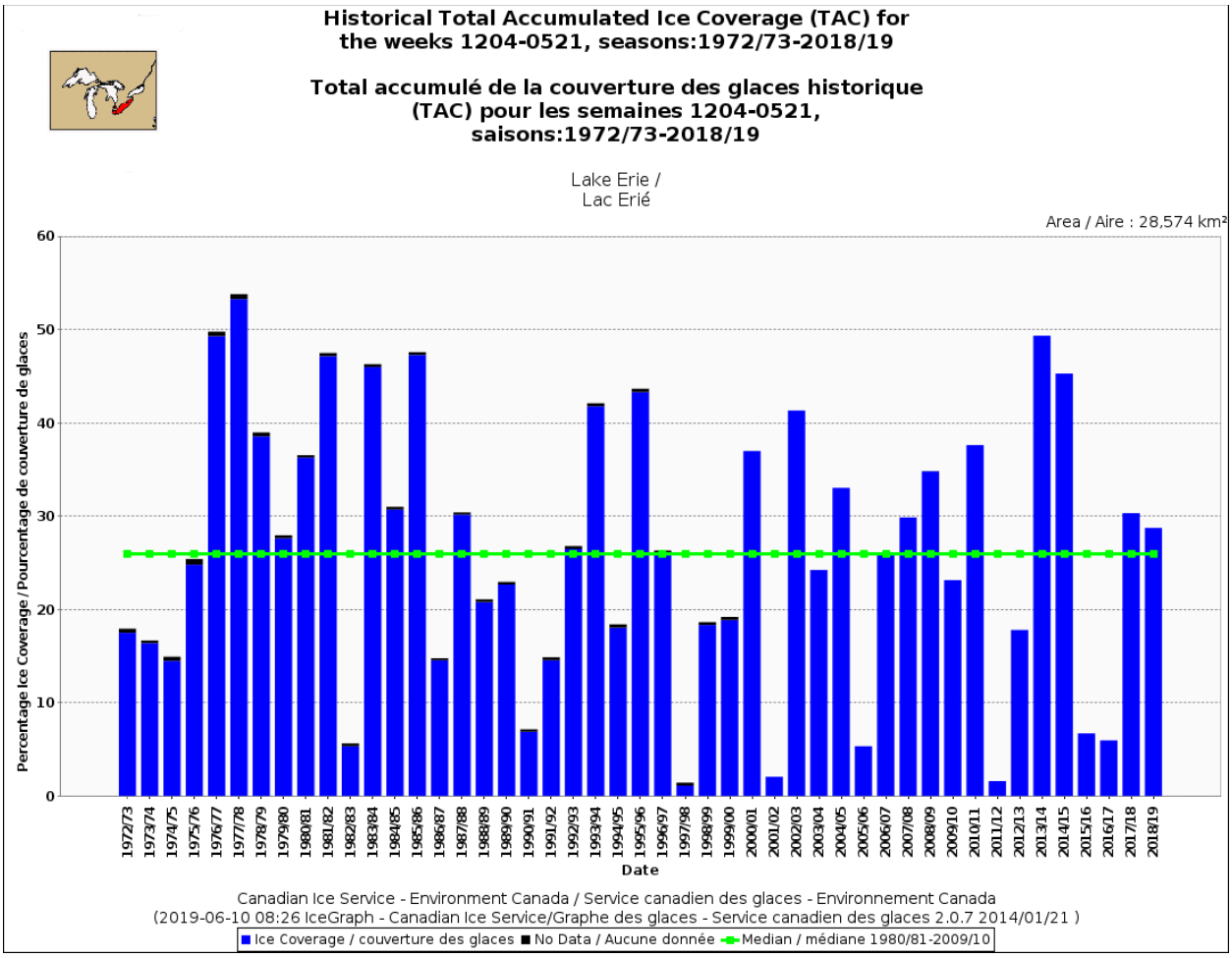

Figure 68: Historical Total Accumulated Ice Coverage in Lake Erie by season, 1972-2019.

Lake Ontario

2018-2019 Season temperatures:

The ice season got an early start as cold air enveloped the lake in mid-November and with it the first ice formation in the Bay of Quinte. Temperatures were 3-4 degrees Celsius below normal until early December. This was followed by a warming trend for the first 2 weeks of December with temperatures warming to near climate normal during that that time.

Normal to slightly above temperatures occurred over Lake Ontario from mid December to mid January. Following a month of slightly above normal temperatures a frigid arctic air mass settled over the Great Lakes in mid-January. Although Lake Ontario was the least affected of the Great

Lakes, it still saw temperatures which were 2-4 degrees Celsius below normal during that time frame.

Much like Lake Erie, Lake Ontario had above normal temperatures for the first half of February while much of the rest of the Great Lakes saw near normal temperatures. A reversal back to cooler temperatures occurred from mid-February to the end of March with temperatures near 2 degrees Celsius colder than normal for the entire lake.

The season finished off in April with near normal temperatures for the month.

2018-2019 Ice conditions:

The early season cold initiated early ice formation on Lake Ontario with the first ice of the season forming on the Bay of Quinte in late November, 1 month before the usual ice formation. The early ice formation did not remain in place long and melted significantly in early December when more seasonal temperatures returned to the lake.

Through the entire month of December, small areas of ice were present around the Bay of Quinte, in the extreme eastern section of the lake along the shore, in the Bays of Prince Edward County, and in parts of the St. Lawrence Seaway. Ice coverage remained near 1% until early January, falling below the climate median in the first week of the month.

With an arctic air mass moving over the lake in mid-January, a significant increase in ice growth occurred. By the 14th of January, ice started to develop along the north shore and in the northeastern section, consisting of new and thin lake ice in lower concentrations. The next week saw continued formation in the same areas with some new and thin lake ice now forming along the southeastern shore. Ice became fast in the Bay of Quinte with some medium lake ice present. Ice coverage jumped back above the climate median in the week of January 22nd to 11.8% covered compared to the climate median of 9.7% for the same week.

The end of January saw the fasting of much of the ice in the northeastern extent of the lake, thickening of the ice from Trenton eastward, and the destruction of the thinner ice along the south shore. This led to a slight decrease in overall ice coverage; however, the ice that remained was thicker than the previous week.

Early February saw continued ice formation with the peak of ice cover occurring on the same week as the climatological peak; the week of February 19th. On that week, the ice cover on Lake Ontario was 25.3%

compared to the climate normal value of 15.0%. Maximum coverage of 25.3% puts 2018-2019 as the 23rd highest maximum ice coverage since the 1972/73 season. The majority of the ice during the week of the 19th was present in the northeastern section of the lake. Ice in the Bay of Quinte had some thick lake ice present while the mobile ice in the extreme northeastern section was mainly medium lake ice. Ice near the shores of Prince Edward County still composed of mainly thin lake ice.

Ice fluctuated slightly in late February as temperatures warmed mid-month then cooled at the end of the month. The first week of March saw a jump in ice cover by almost 10% as some new and thin ice bloomed in the northern half of the lake. That ice was rapidly destroyed in the next week with the only ice remaining being the fast ice in the northeastern section and the ice around Prince Edward County.

The week of the 25th of March saw the fracture of the fast ice in the northeastern section begin with melt continuing elsewhere. The melt season was roughly 1 week late than the climatological normal with the week of April 8th having 2.3% ice cover compared to the usual fully melted ice at that time. The ice remaining was small concentrations of rotten thick lake ice in the Bay of Quinte, some bays of Prince Edward County, and in the area around the entrance to the St. Lawrence Seaway. All ice remaining on the lake melted rapidly in the second week of the month.

TAC for the 2018-2019 season was 6.8%, above the median of 5.7%. This puts the ice season as the 16th highest TAC since the 1972/73 season and above the 2017/18 season of 5.8%.

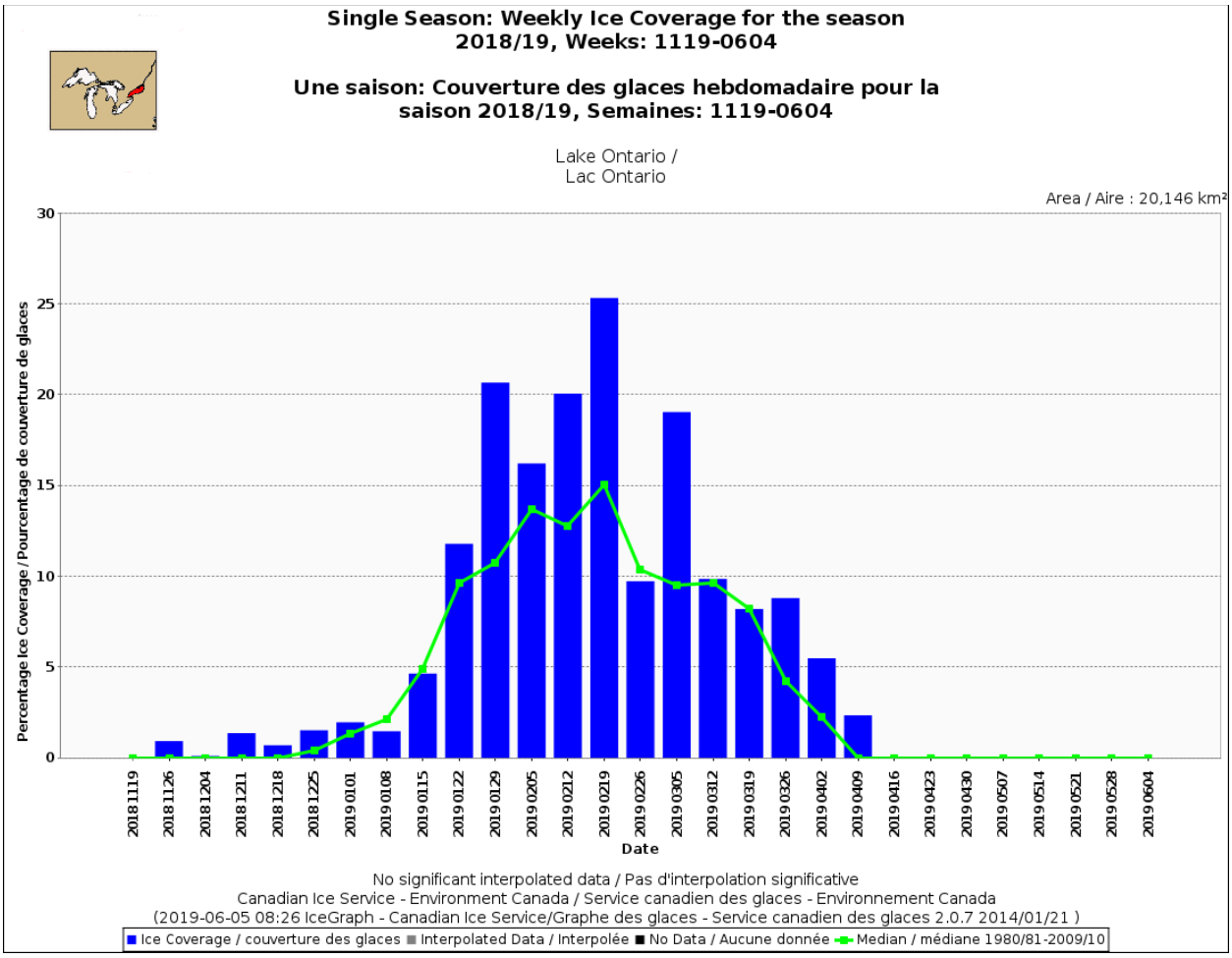

Figure 79: Weekly Ice Coverage in Lake Ontario for winter 2018-19.

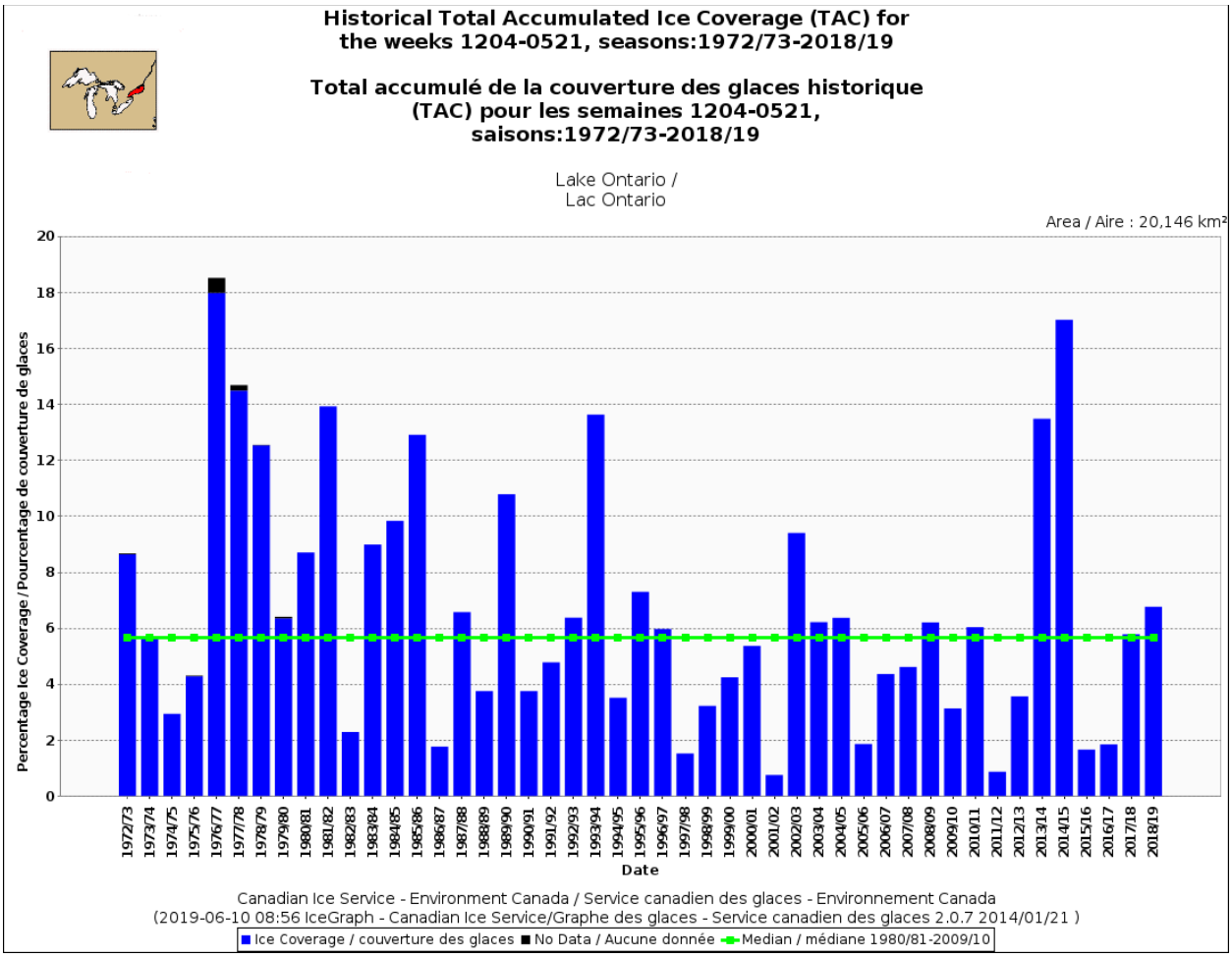

Figure 20: Historical Total Accumulated Ice Coverage in Lake Ontario by season, 1972-2019.