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Climate Change Canada

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## Newfoundland and Labrador

### Quarterly Climate Summary: Fall 2021

#### Summary & significant weather events (September-November):

It was an active fall with a seemingly never-ending supply of low pressure systems moving through the area, beginning early on with the passage of Hurricane Larry, and ending with historic November rainfall in southwestern Newfoundland.

Warmer than normal temperatures lead to much lower snowfall than normal for Newfoundland, while in Labrador a few late storms allowed some area to catch up to or even surpass the fall average. In addition, the same warm temperatures has once again led to generally ice free pond waters and a delay to ground frost.

However, things weren't all bad, some people along Newfoundland's west coast claim it was some of the nicest September and October months they've ever experienced.

Regardless of how one feels about it, for most, it does appear to have been at least a memorable fall in some way.

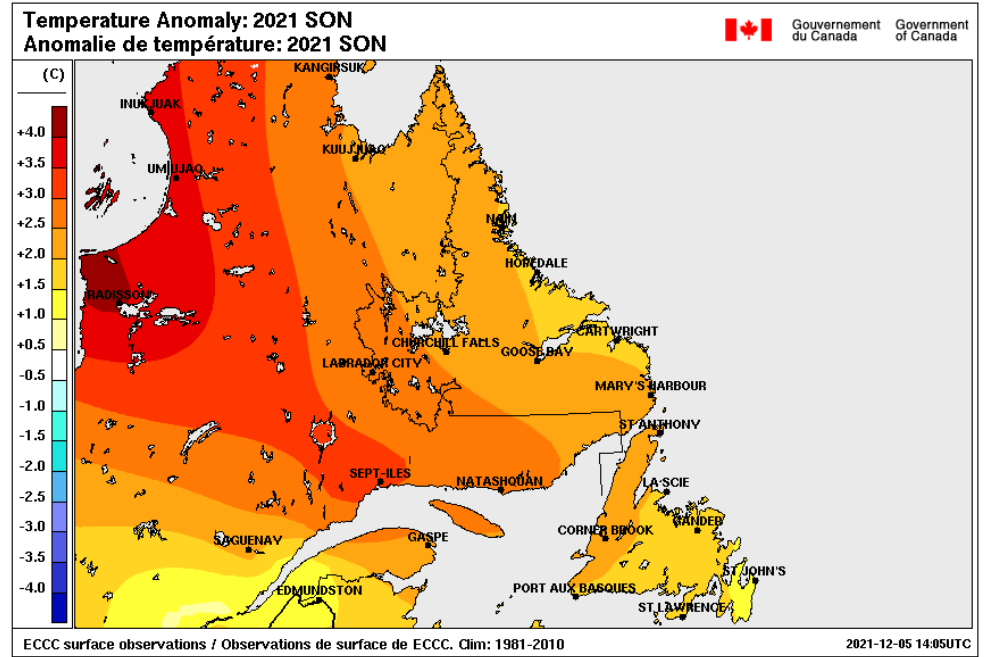
## Provincial Climate Overview (September - November):

### Temperature (Departure from Normal):

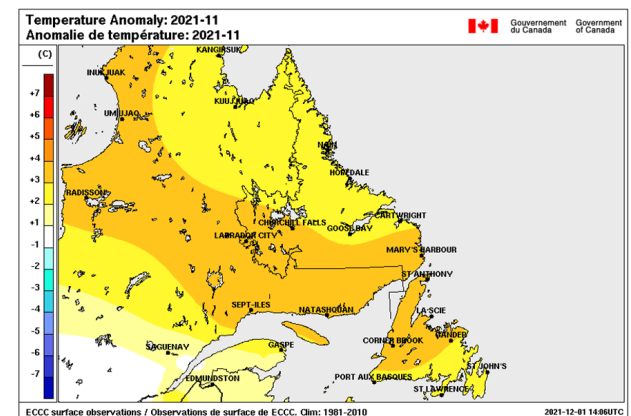
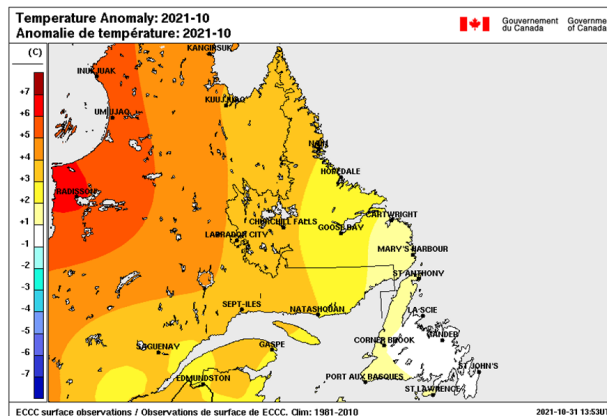
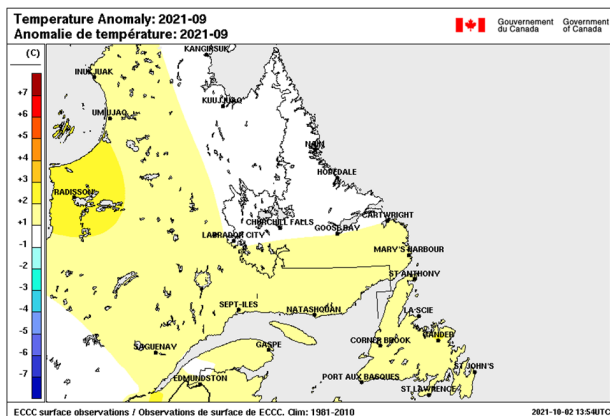
Temperatures for this Fall (averaged over September, October, and November) continued the trend in the most recent seasons of being generally warmer than normal (1 to 3 C in this case). We have to go back to Spring of 2020 to find a below normal seasonal average temperature.

### Highlights:

- Warmest fall on record for Wabush, Corner Brook and Channel-Port aux Basques.
- 2nd warmest fall on record for Bonavista, L'Anse au Loup and Hopedale.
- 3rd warmest fall on record for Happy Valley-Goose Bay and Nain.
- 4th warmest fall on record for Cartwright, St. Lawrence and Stephenville.



above: Temperature anomalies for Newfoundland and Labrador for September-November combined.



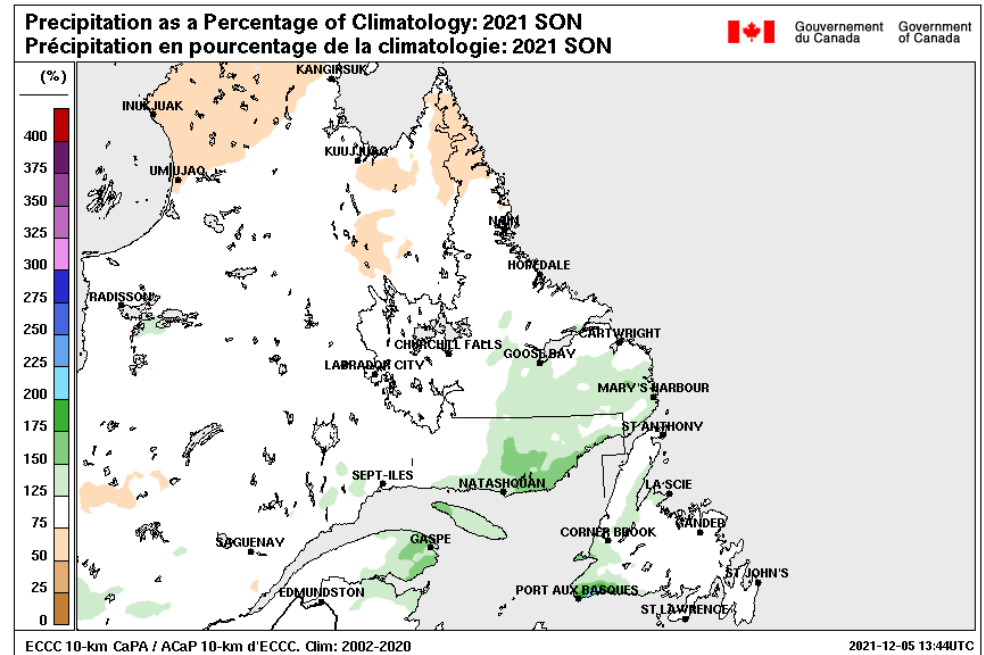
left to right: Temperature anomalies for Newfoundland and Labrador for September, October, and November.

## Precipitation (Percent of 2002-2020 average):

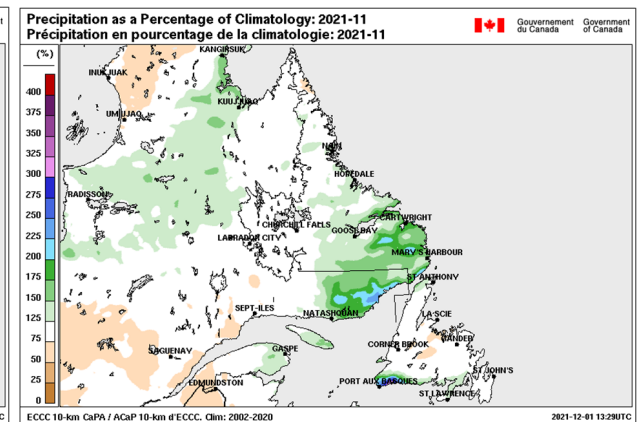
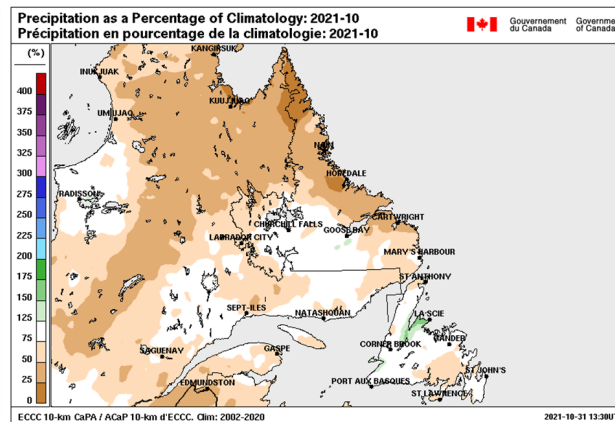
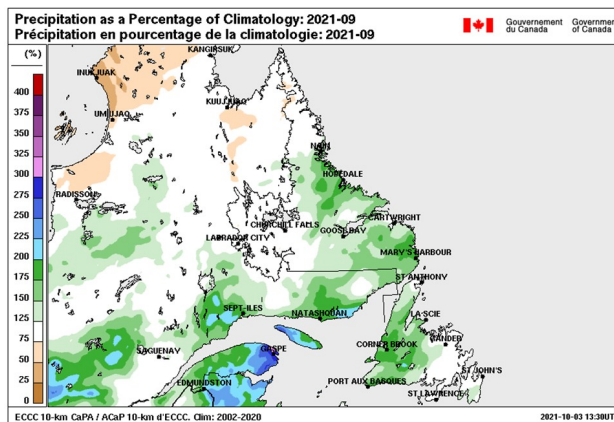
Precipitation for this Fall (totalled over September, October, and November) was generally near normal for most areas in the province. However, a sizeable portion of southeastern Labrador and southwestern Newfoundland did report higher than normal precipitation, mostly due to the one record rainfall event in November (details in Significant Events section).

### Highlights:

- November had the highest precipitation total for any calendar month on record in the Port Aux Basques.
- Wettest fall on record in Port Aux Basques and Stephenville.
- 2nd wettest fall on record in L'Anse au Loup.



Above: Precipitation as a percentage of 2002-2020 average for Newfoundland and Labrador for September-November combined.



Above left to right: Precipitation anomalies for Newfoundland and Labrador for September, October, and November.

## Seasonal Temperature and Precipitation Tables:

Seasonal temperature averages and precipitation totals compared to seasonal normals for September to November 2021, for selected locations in Newfoundland and Labrador

	Mean Temperature (°C)			Total Precipitation (mm)		
Location	Seasonal Mean	Average of Monthly Normal Means	Diff.	Seasonal Total	Total of Monthly Normals	Seasonal Total as % of "Normal"
Bonavista	9.3	7.3	2.0	273.0	327.4	83
Channel-Port aux Basques	10.2	7.4	2.8	679.0	421.8	161
Corner Brook	9.9	7.6	2.3	432.4	340.2	127
Gander	8.3	6.5	1.8	315.5	341.9	92
St. John's	9.0	7.6	1.4	433.3	433.8	100
St Lawrence	10.0	7.6	2.4	390.5	487.1	80
Stephenville	9.7	7.6	2.1	604.0	373.0	162
Terra Nova Nat Park	8.4	6.8	1.6	322.2	322.2	100
L'anse au Loup (Lourdes de Blanc Sablon)	6.0	3.7	2.3	388.7	251.4	155
Cartwright	5.0	3.6	1.5			
Happy Valley-Goose Bay	5.1	3.1	2.0	343.2	244.4	140
Hopedale	4.4	2.9	1.6			
Nain	3.7	1.7	1.9			
Wabush	2.7	0.0	2.7			

Above: cells shaded pink if  $\geq 1$  °C, blue if  $\leq -1$  °C. Precipitation as a percent of normal: cells shaded green if  $\geq 125\%$  of normal, yellow if  $\leq 75\%$  of normal

## Significant Weather events:

**September 10-11:** [Hurricane Larry](#) tracked northeastward and passed across southeastern Newfoundland in the early hours of September 11<sup>th</sup>. Wind gusts in the 90 to 145 km/h range were reported across the area, causing structural damage to homes and businesses and numerous down trees and power lines. Roughly 61,000 customers lost power during the event. A record-breaking storm surge of 1.5 m was reported at Argentia, and combined with large waves, damage to wharfs and road washouts were also reported in many south-facing coastal towns along the Burin and Avalon peninsulas.

**September 19-20:** Post Tropical Storm Odette passed by well to the south of Newfoundland bringing heavy rain and strong winds to southeast parts of the Island. The [highest rainfall totals](#) were generally in the 30 to 50 mm range and [maximum wind gusts](#) in the 70 to 115 km/h. Some minor power outages were reported.

**September 21-23:** A warm southerly flow across the region resulted in many new daily temperatures records being set across the region. Maximum temperatures reached the 22 to 28 C range. Temperatures remained mild overnight as well setting some new records for high minimums, generally in the 11-14 C range.

**October 8-10:** A rapidly intensifying low-pressure system just east of Newfoundland brought strong northerly winds, rain, and large waves to the eastern half of the Island. [Minor coastal flooding](#) and [road closures](#) were reported at many east and north facing communities due a combination of large waves, storm surge, and high tides. Peak wind gusts ranged from 100 to 122 km/h over eastern Newfoundland, causing some minor power outages.

**October 22-24:** A frontal system brought heavy rain, strong winds and falling temperatures as it crossed Newfoundland. Ahead of the cold front, some record high temperatures (14 to 18 C) were set across southwestern Newfoundland. Winds in exposed coastal locations gusted above 90 km/h and rainfall totals in some locations reached 40 to 75 mm. In addition, some embedded thunderstorms left roughly 10 000 customers without power on the Avalon Peninsula after [lightning struck transmission lines](#) in several locations.

**October 29-30:** A large dome of high pressure remained near stationary over Labrador causing record high temperatures ranging between 13 to 16 C, 1-3 degrees higher than previous records. On October 29th Nain measured a temperature 8.4 degrees C above the previous record, ending the day with a high of 15.7 C.

## Significant Weather events:

**Nov 5:** An intense low tracking southeast of Newfoundland brought the [first significant snowfall](#) event of the season to the Island, with [up to 18 cm](#) reported on the Avalon Peninsula.

**November 22-26:** A slow moving frontal boundary brought heavy rain to southwestern Newfoundland, setting several new rainfall records (two-day, three-day and 24 hour) with a two-day rainfall record of 165.1 mm in Port Aux Basques. An incredible two-day total of 242 mm was reported at an unofficial station in the village of Tompkins. In addition, strong winds gusted between 90 and 141 km/h over southwestern Newfoundland stations. Finally, warm temperatures were observed in several locations in Newfoundland, setting new high temperature records between 8 and 15 C. The historic deluge caused [severe flooding](#) over southwestern Newfoundland, with 4 sections of the Trans-Canada Highway and several side roads experiencing major washouts. Due to the [southwest being cut off from the rest of the Island](#), Marine Atlantic was forced to change its ferry route to Argentia, something never before done in the month of November.

Further north, the persistent frontal boundary brought an extended period of freezing rain to the Labrador interior, causing an [extended power outage](#). Some customers were without power for more than 24 hours, as a mixture of snow and poor flying conditions hampered crews ability to find the problem.

**November 29-30:** A low tracked through the Maritimes and across Labrador bringing heavy rain, snow and strong winds to Newfoundland and southern Labrador. Rainfall amounts ranged from 30-70 mm and near 20 cm of snow fell in the Happy Valley-Goose Bay area. Wind gusts ranged between 90 to 110 km/h.

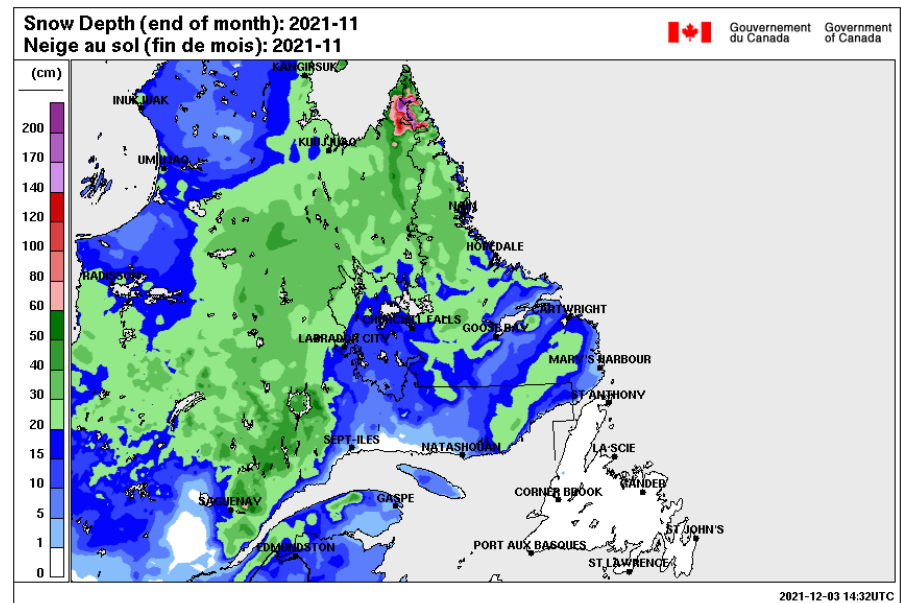
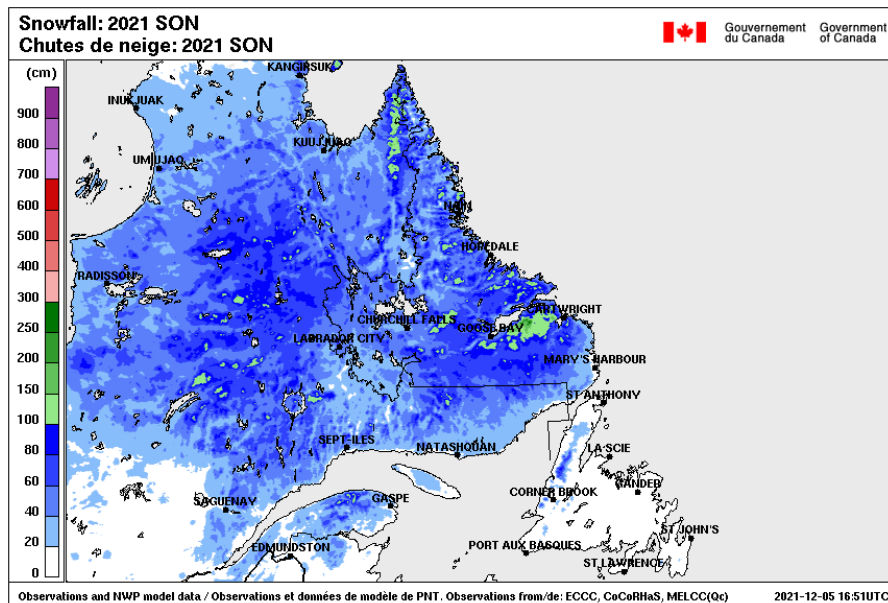


## Total Snowfall and Snow Depth:

Warmer than normal temperatures meant a distinct lack of snow for Newfoundland and a slow start to winter in Labrador.

In Newfoundland, the only areas to receive any significant snowfall were the higher elevations of the west coast, and even that didn't last by the end of the month. Most stations in Newfoundland reported 20 to 30 percent less snow than normal during the Fall, with the exception of St. John's Airport, which reported near normal snowfall after one single event in early November.

Labrador did get some snow, but the larger majority of the storms were events with temperatures above freezing, which in turn meant little to modest accumulations. Makkovik, Nain and Wabush Airport all recorded below normal seasonal snowfall totals. Happy Valley-Goose Bay is the only station that reported more snow than normal for the season, measuring slightly more snow than average, most of it falling in the last half of November.



Left: Total snowfall (estimated) for September, October, and November combined.

Right: Snow depth (estimated) for Newfoundland and Labrador at the end of November 2021

## Sea Surface Temperature (Departure from Normal):

### September

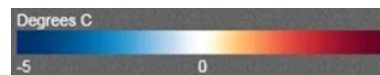
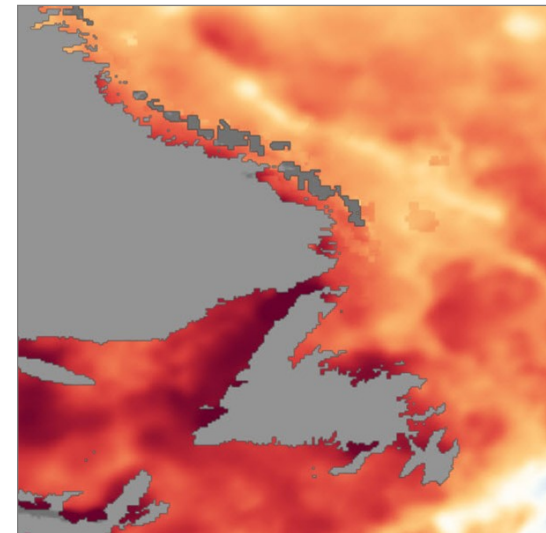
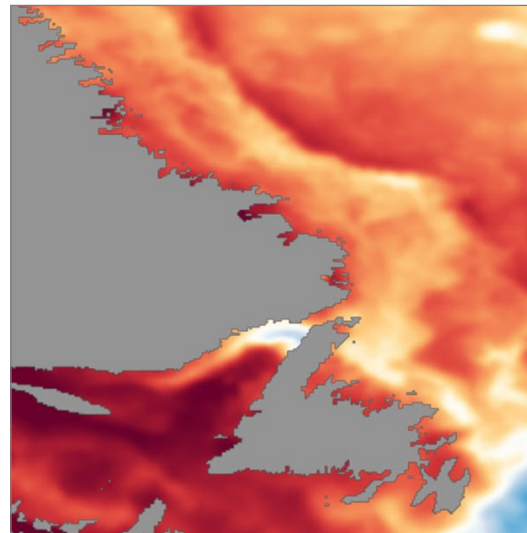
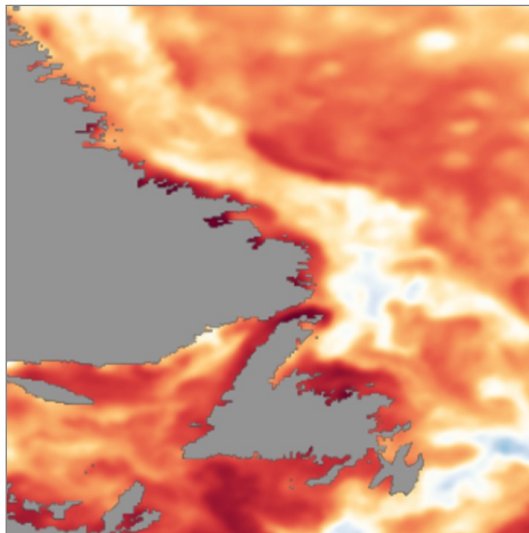
- \* Noticeable decrease from August
- \* Warmest along the coasts (3-5 C above)
- \* Coolest north and east of Newfoundland (0-1 C below)

### October

- \* Warmer anomalies over most areas.
- \* Warmest in the Gulf and near most of coastal Newfoundland. (3-5+ C above)
- \* Area below normal near Strait of Belle Isle and also in the Grand Banks (1-2 C below).

### November

- \* Warming over both cooler than normal areas from October.
- \* Still Warmest along the coasts and in the Gulf of St. Lawrence (3-5+ C above)
- \* Only the Grand Banks seems to be near normal.



NOAA weekly mean SST anomaly map (based on 1981-2010 Normals) for the last week of Sep 2021 (left), Oct 2021 (middle), and Nov 2021 (right)

<https://www.nnvl.noaa.gov/view/globaldata.html#SSTA>

**Note:** We are excluding the area over the southern Grand Banks where the Labrador Current and the Gulf Stream meet. This area is extremely variable even in normal conditions. Grey areas along much of the coast may represent either gaps in data or presence of sea ice.



## Sea Ice Outlook:

Over all, sea ice is expected to be below normal this year due to warmer than normal temperatures forecast this winter.

### December

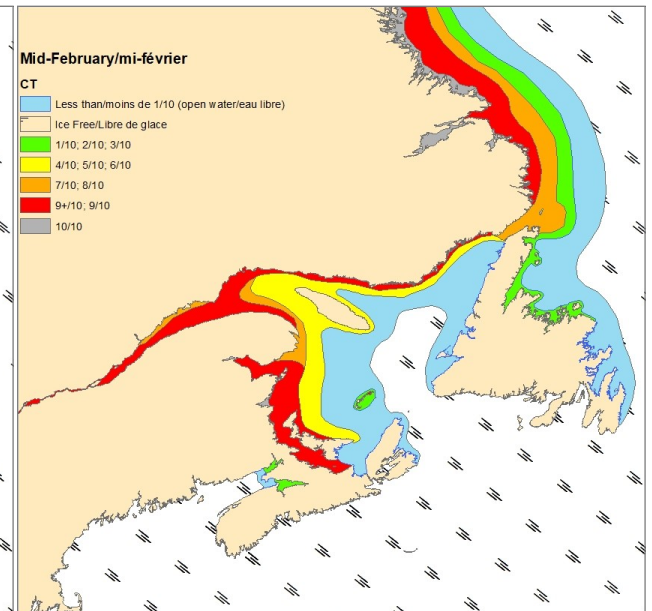
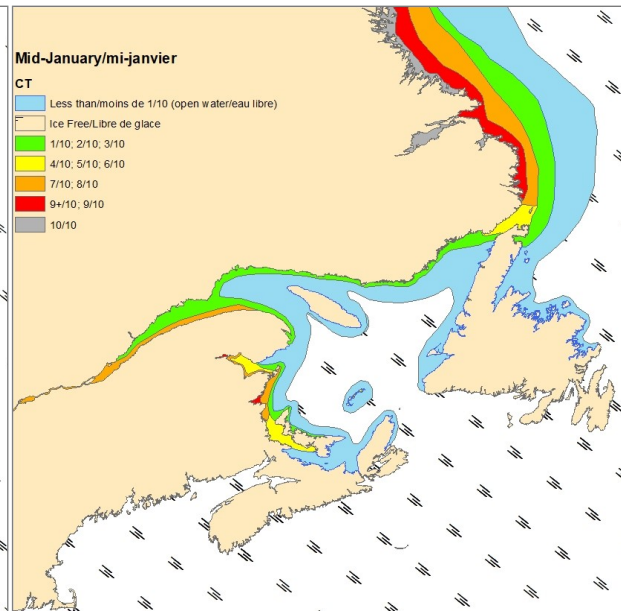
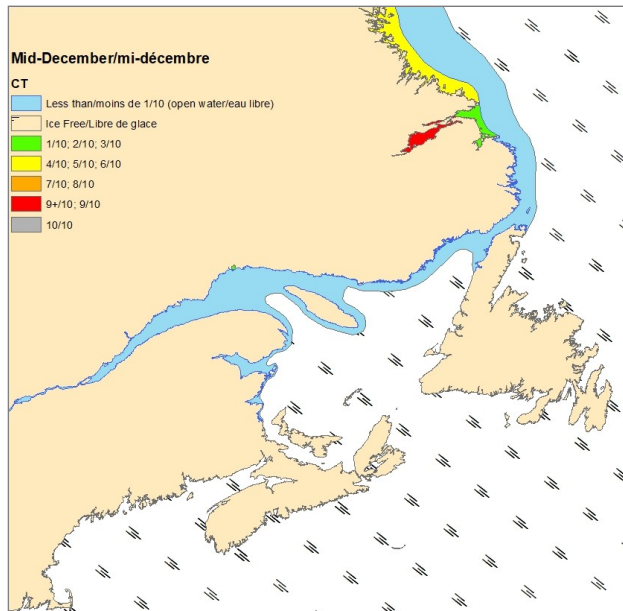
- \* Ice will begin to expand down along the Labrador coast.
- \* Lake Melville to fully freeze over by the end of December.
- \* Ice may also reach the Strait of Belle Isle by the end of the month.

### January

- \* Ice along the Lab coast and in Lake Melville will likely fully freeze in early January as ice thickens along the Labrador coast.
- \* Strait of Belle Isle to become partly ice covered.
- \* Ice to begin forming in sheltered bays along Newfoundland's northeast coast.

### February

- \* Ice along the whole Labrador coast and into the Strait of Belle Isle and eastern side of Great Northern Peninsula.
- \* Sea ice will expand along the northeast coast of Newfoundland.



Forecast ice concentrations based on current long range seasonal guidance and ice coverage in recent years for the mid point of December (left), January (middle), and February (right) 2021-2022, as per Canadian Ice Services.

## River Flows:

In **September**, we had our two stations on the southwest coast and west coast reporting excessive flow. The Avalon and Labrador rivers were slightly above normal flow while Gander River reported just above half it's median flow.

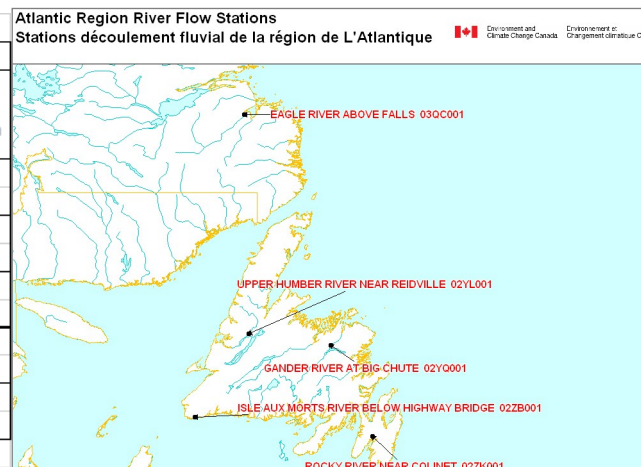
In **October**, not much changed except for at Isle aux Morts, which reported slightly below normal flow. Otherwise, the Upper Humber River reported another month of excessive flow while the Labrador and Avalon stations reported near normal. Once again, Gander River reported just above half its median flow.

There was some change in **November**. While the Avalon and Labrador stations remained near normal, the remaining stations had some notable changes. Gander reported a third month of just above half the median flow, this time officially reaching deficit values. In the southwest and west we saw some huge swings. The Upper Humber River dropped from two straight months of excessive flow down to just below normal, while Isle aux Morts river jumped to well above average, reporting a new record excessive flow. This was mainly due to the extreme rainfall event that occurred during the month.

**Preliminary monthly runoff summary for selected river sites in Newfoundland and Labrador (location map below) for September, October, and November 2021, courtesy of ECCC Water Survey of Canada. Note: Record values provisional and may change after the data is reviewed.**

### Newfoundland and Labrador, Surface Water Conditions, Preliminary Data

River Flow Station		Sep 2021		Oct 2021		Nov 2021	
Station Number	Drainage Area (km <sup>2</sup> )	Mean Flow (m <sup>3</sup> /s)	% of Median	Mean Flow (m <sup>3</sup> /s)	% of Median	Mean Flow (m <sup>3</sup> /s)	% of Median
EAGLE RIVER ABOVE FALLS 03QC001	10900	257	137	226	109	197	106
GANDER RIVER AT BIG CHUTE 02YQ001	4400	52.1	64	78.8	69	96	67
ISLE AUX MORTS RIVER BELOW HIGHWAY BRIDGE 02ZB001	205	18.6	166	11.4	83	43.8	243
ROCKY RIVER NEAR COLINET 02ZK001	301	7.7	114	9.89	97	16.1	118
UPPER HUMBER RIVER NEAR REIDVILLE 02YL001	2110	123	246	116	165	76.5	87
E - Excessive (> 75th percentile (based on 30-years, 1981-2010))							
D - Deficient (< 25th percentile (based on 30-years, 1981-2010))							
R - Record (provisional new extreme (preliminary data subject to review), compared to period of record up to 2010)							
Sep analysis produced Oct 18, 2021							
Oct analysis produced Nov 22, 2021							
Nov analysis produced Dec 17, 2021							



## Canadian Drought Monitor (produced by Agriculture and Agri-Food Canada):

### September

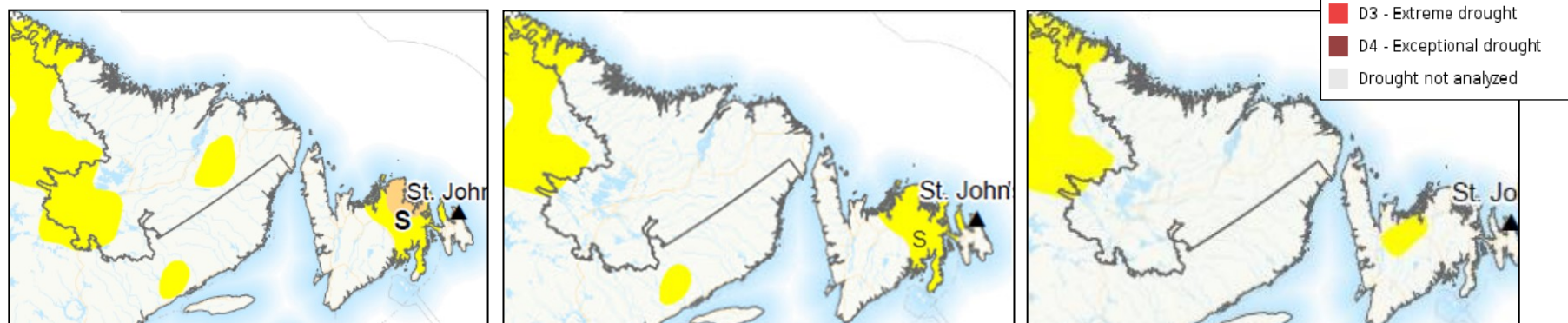
- \* Abnormally dry conditions over parts of Western Labrador and eastern Newfoundland.
- \* Moderate drought over Newfoundland's northeast coast.
- \* September conditions mostly carried over from previous months.

### October

- \* Abnormally dry conditions remain over eastern Newfoundland.
- \* Area over Western Labrador has receded to the north.

### November

- \* Only a small area in central Newfoundland remains abnormally dry.
- \* No change from October for Labrador.



Canadian Drought Monitor Map for September 30, 2021 (left), October 31, 2021 (middle), and November 31, 2021 (right) . Drought maps courtesy of Agriculture and Agri-Food Canada- <http://www.agr.gc.ca/eng/programs-and-services/list-of-programs-and-services/drought-watchcanadian-drought-monitor/?id=1463575104513>

## **Provincial Impacts (September—November):**

### **Another Warm Fall in Labrador (and Newfoundland):**

After another warmer than normal fall, it is no surprise to see that sea ice and pond ice is once again delayed this year. While the last half of November was a step in the right direction, the current outlook for winter is calling for less sea ice than normal. This [change in sea ice](#) and freezing ponds has a profound impact of the Inuit way of life in Labrador. Locals are now having to pay more attention to sea ice and swell conditions, often opting not to travel in locations that were frequently used in the past.

A similar problem is happening in Newfoundland, albeit the impacts are more recreational in nature. With warmer late fall periods, bogs and ponds are not having a chance to properly freeze before the onset of snow. The result is unsafe ice conditions for ice fishers and snowmobilers, as snow tends to insulate the underlying surfaces from cold air and prevents significant ice formation. There have been numerous reports of people falling through ice in the last couple of winters. Furthermore, Parks Canada has delayed the snowmobile season in Gros Morne National Park in order to protect the natural habitat from damage due to a lack of snow. It has been pushed back until early January for the second year in a row.

### **Hurricane Larry, Storm Surge and Historic Rains:**

There were several significant storms this fall that had short to long-lasting impacts on the region. The first being Hurricane Larry, which charged through Placentia Bay in the early hours of September 11th. As a Category 1 hurricane, Larry brought very strong winds and record-breaking storm surge to southeastern Newfoundland. Winds downed trees, damaged roofs and other structure, and even forced the cancellation (and subsequent relocation) of several concerts after [the Iceberg Alley tent](#) was completely flattened during the storm. At the peak, 61 000 customers were without power during the storm. Along the coast, a town on the Burin Peninsula was evacuated due to storm surge and suffered major damages to their coastal infrastructure. Similar impacts were felt on the [southern Avalon Peninsula](#), as many coastal community reported damage wharfs and road washouts.

Almost exactly one month later, an intense storm struck eastern Newfoundland again on Thanksgiving Weekend. While the storm wasn't quite as windy and didn't pack as much storm surge as Larry, [large waves and pounding surf](#) did result in some coastal flooding. Surf washed up debris onto many low lying roads in north facing communities of the Avalon Peninsula, an increasingly more frequent problem in the past 10 years. Officials were forced to close a section of route 70 in Spaniards Bay due to the waves crashing debris over the seawall, and further east, sea water inundated an [archaeological dig site near Ferryland](#).

Finally, historic rainfall over southwestern Newfoundland from November 22 to 26, caused severe impacts to the area after multiple sections of the TransCanada highway washed out along with many secondary roads in the Codroy valley. [The supply chain was disrupted](#) for the Island, as Marine Atlantic was forced to change its ferry route to the much longer route landing in Argentia. It was just over a week before the sections of the highway were reopened, and the backlog of goods and passengers could begin flowing onto the island as normal again.

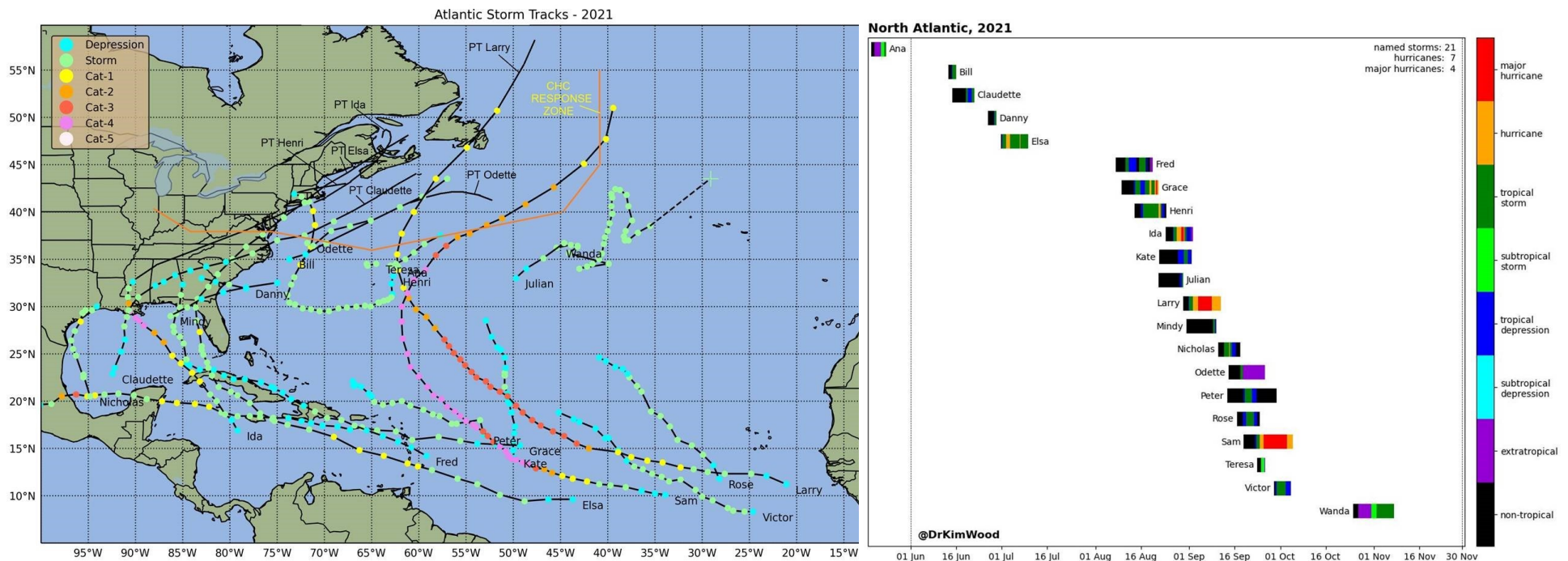


## 2021 Tropical Cyclone Season Summary:

There were 21 named storms this season, with seven of them becoming hurricanes and four reaching major hurricane status. An above average eight named storms entered the Canadian Hurricane Centre's Response Zone, with five of them requiring messaging by the Canadian Hurricane Centre. The most impactful storm was Hurricane Larry, which tracked over southeastern Newfoundland and left much damage in its wake.

While the hurricane season officially ended on November 30 with no storms forming in November, this is the 7th consecutive year with a named storm forming before June 1st. It was also the third most active year on record in terms of named storm, making it now 6 consecutive years of above-normal Atlantic hurricane seasons. Finally, it was the first time on record that two consecutive hurricane seasons went through all 21 name on the list.

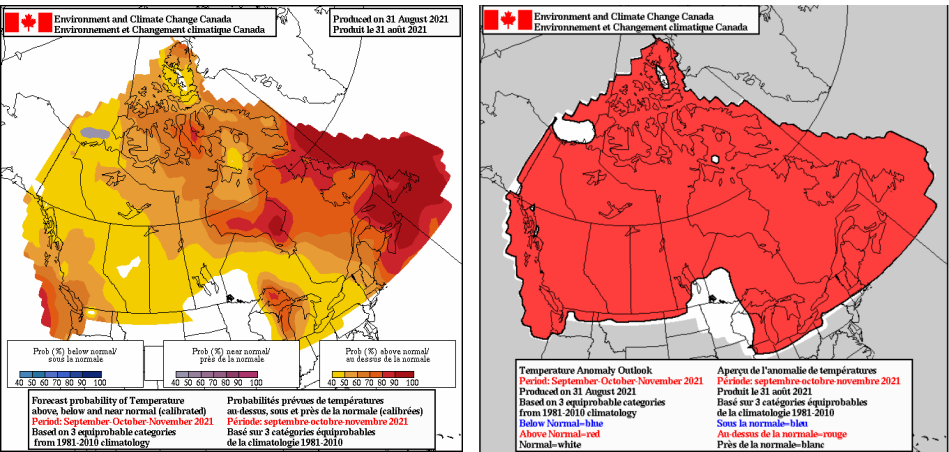
More information can be found here: <https://www.noaa.gov/news-release/active-2021-atlantic-hurricane-season-officially-ends>



All 2021 Tropical Cyclone tracks edited by the Canadian Hurricane Centre (Left). A cyclone strength and duration plot for each storm in the 2021 season (Right).

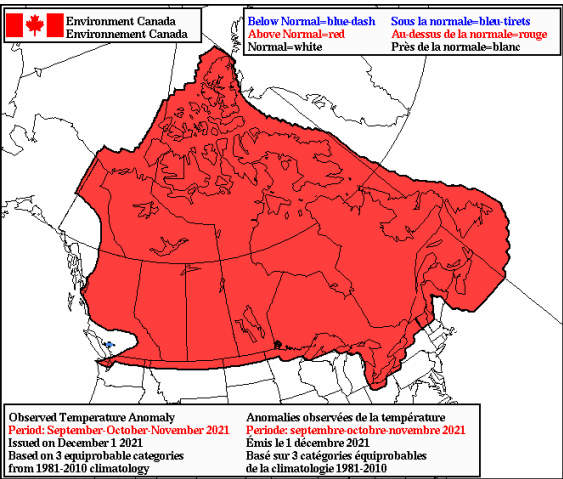
# Fall Season (Period: September-October-November) Temperature Outlook Performance:

The fall temperature forecast called for a high probability of warmer than normal temperatures across almost all of Canada.



Left: Probability of above, below and near normal: Produced August 31, 2021 – Right: Forecast Temperature Anomaly: Produced August 31, 2021

The observed temperature anomaly matched the outlook very well, especially here in Atlantic Canada.



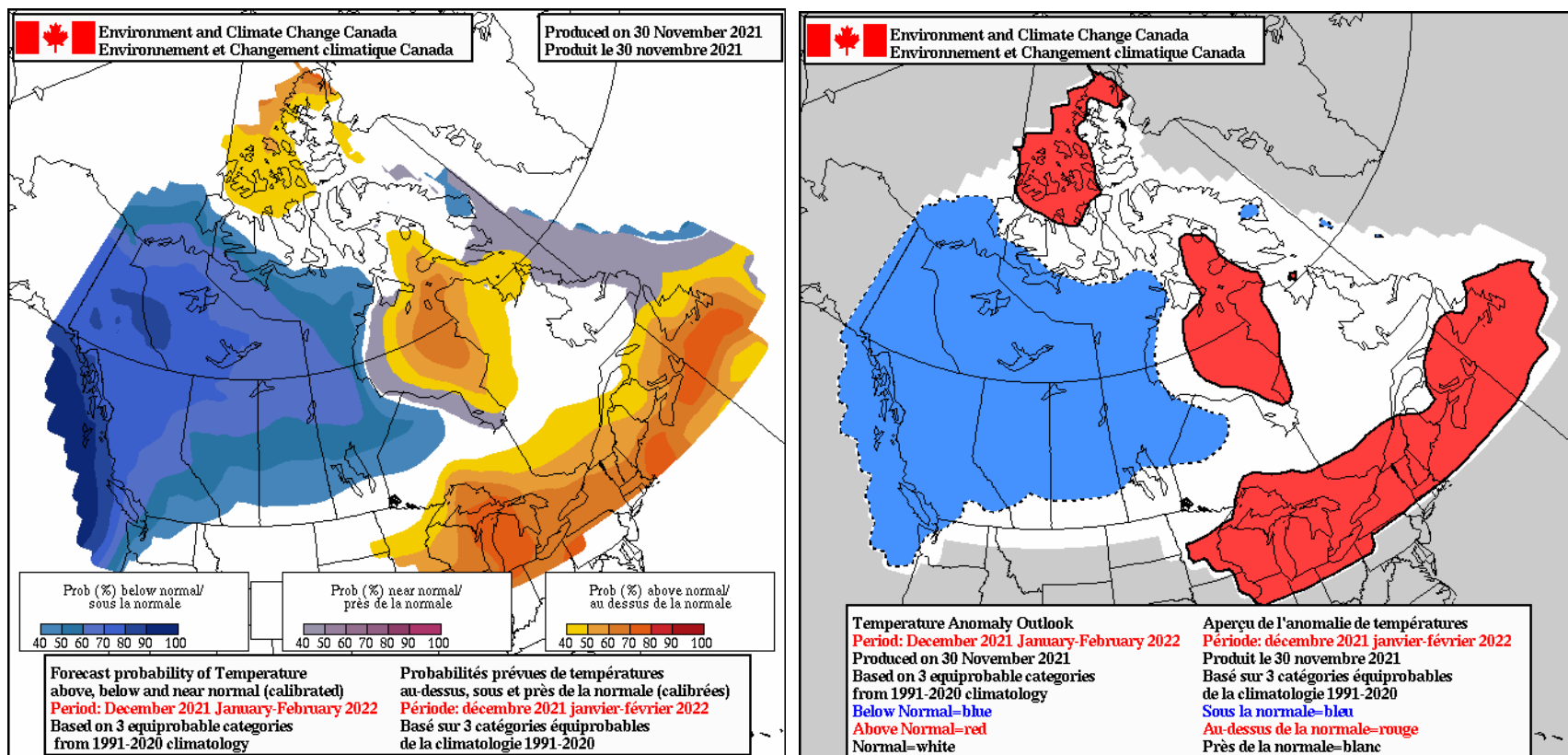
Above: Observed Temperature Anomaly – Issued on December 1, 2021



## Winter Season (Period: December-January-February) Temperature / Precipitation Outlook:

Looking ahead to winter, we generally see a mixture of signals. There is a low to moderate chance of warmer than normal temperatures over most of Newfoundland. Over the Labrador Sea, Labrador coast, and the Great Northern Peninsula, there is a low chance of near normal conditions. Over the Labrador interior, there is no dominant signal.

With regards to precipitation, guidance shows a low chance of wetter than normal conditions over southwest Newfoundland, western Labrador, and parts of the Labrador Sea. Otherwise there is no signal. Once again, we are excluding the precipitation maps as they typically verify less than 40% of the time.



Left: Probability of above, below and near normal temperature: Produced November 30, 2021 – Right: Temperature Anomaly Outlook: Produced November 30, 2021  
[https://weather.gc.ca/saisons/index\\_e.html](https://weather.gc.ca/saisons/index_e.html)

# **Contact Information:**

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Previous summaries can be found here: <https://www.arctic-rcc.org/>