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# Newfoundland and Labrador Quarterly Climate Summary: Fall 2020

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

A historic Atlantic Hurricane season mostly spared the province, though the remnants of Hurricane Sally managed to soak much of eastern Newfoundland. Otherwise, much of the island actually enjoyed a second summer of sorts. In Labrador, things were mostly calm during the season. That was, of course, until the very end when an intense storm brought a Snowmageddon-esque storm to the Upper Lake Melville area.

After a benign start to September, the middle part of the month produced some

heavy rainfall from remnants of Hurricane Sally and strong winds from Post-Tropical Storm Teddy. After these storms passed, a heat wave of sorts settled in over the island to end off the month on a high note.

October was a relatively wet month over portions of the province. With that came some of the first accumulating snowfall events for parts of the province. Overall, northeastern Newfoundland and southeastern Labrador ended up with warm, dry Octobers, contrasting many other areas of the province.

November quickly established itself with two storms in the first four days, and combined to have effects on all areas of the province. A few more storms would impact the province, though the best was saved for last. A November blizzard was born for central and mid-coast Labrador near the final week of the month, and brought a month's worth of snow to the Happy Valley-Goose Bay area.

# Significant Weather Events:

September 18-19: Rain at times heavy occurred thanks to a trough of low pressure tapping into tropical moisture from remnants of Sally.

• **Rainfall**: Placentia picked up 206 mm and Goobies received 154 mm. Bay Roberts reported 126 mm, while North Harbour and Spaniard's Bay each got 123 mm. Stations elsewhere across eastern Newfoundland reported rainfall totals in the 48-122 mm range.

## September 23-24: Post-Tropical Storm Teddy gave some strong winds and high waves to parts of the island.

- Wind: Wreckhouse peaked at 132 km/h. Stations elsewhere across western and southern Newfoundland reported peak gusts of 75-90 km/h.
- Rainfall: 50 mm was reported at Cartwright. Generally 20-40 mm fell across southwestern Newfoundland.

### September 28-30: One last gasp for summer?

• **Temperatures:** Seven stations in Newfoundland set or tied daytime high records on September 29. Long Island (Green Bay) hit 27.7 degrees C on that day, with daytime highs across the island in the 21-27 degree range. Also, five stations set daytime high temperature records on the 30th.

October 2-3: A low pressure system gave a dose of rain to the Avalon Peninsula.

• Rainfall: Whitbourne got 66 mm while Salmonier picked up 63 mm. Elsewhere on the Avalon, 25-55 mm of rain was reported.

**October 7-9:** A deep low pressure system tracked across the province. With it came rain for the island, accumulating snow for western and northern Labrador, and strong winds province-wide.

- **Rainfall:** 51.5 mm was reported at Kippens and 47 mm accumulated at Stephenville. Amounts in the mid-30's were observed in parts of the south coast of Newfoundland, the Labrador Strait, and Happy Valley-Goose Bay.
- **Snowfall:** 4-7 cm accumulated at Happy Valley-Goose Bay, Wabush, and Nain.
- Wind: A 111 km/h gust was observed at Port aux Basques and 104 km/h at Nain. Bonavista and Churchill Falls recorded gusts near 95 km/h,

October 14-15: Another storm tracking across Labrador with strong winds and rain for Newfoundland.

- Rainfall: 57 mm was reported at Port aux Basques, while Burgeo reported 53 mm. 34-44 mm were reported at select stations elsewhere southern and western Newfoundland.
- Wind: Wreckhouse hit a peak of 117 km/h and Green Island (Fortune Bay) gusted to 80 km/h.

October 26-27: Accumulating snowfall in eastern and central Newfoundland due to a quick moving low across eastern Newfoundland.

• **Snowfall:** Gander received 11-14.5 cm and Grand Falls-Windsor reported 6 cm.

# **November 2-3:** An intense storm tracked through Labrador. <u>Rain and very strong winds</u> were on tap for the island and parts of Labrador, while snow was on the menu for western and northern Labrador.

- Wind: Wreckhouse winds hit 140 km/h and Blanc Sablon reported a peak of 122 km/h. Widespread peak wind gusts of 80-113 km/h were observed elsewhere in the province.
- Rainfall: St. Alban's picked up 58 mm and Goose Bay got 50 mm. 15-30 mm fell elsewhere.
- **Snowfall:** 5-8 cm of snow were reported at Wabush, Goose Bay, Nain and Makkovik.

**November 3-4:** After a slight breather, a fast-moving system brought a dose of rain followed by snow to the Avalon Peninsula. Significant snowfall was reported in other parts of eastern Newfoundland.

- Snowfall: 26-28 cm was observed in Gander, while an estimated 21 cm fell at Terra Nova. Clarenville picked up 20 cm while St. Alban's received 16 cm.
- Wind: Bonavista peaked at 103 km/h while a few stations elsewhere in the east reported 87-94 km/h.
- Rainfall: Generally 15-25 mm fell on the Avalon.

**November 14-15:** A low pressure system passed southeast of the island and gave the Avalon its first shot of snow for the season.

• **Snowfall:** St. John's Airport recorded 15 cm and two stations in Mount Pearl reported 9-10 cm.

# November 16-17: A frontal wave gave strong southerly winds to the island.

• Winds: Wreckhouse winds hit 116 km/h and Pool's Island got to 107 km/h. Widespread gusts in the 80-102 km/h range occurred elsewhere.

# **November 23-25:** An intensifying low brought blizzard conditions to much of Labrador and strong winds to Newfoundland.

- Snowfall: Goose Bay reported 75 cm and Mud Lake got 73 cm. Makkovik reported 29 cm and Wabush ended up with 16 cm.
- Winds: Green Island (Fortune Bay) hit 142 km/h and Wreckhouse got a gust to 127 km/h. Peak gusts of 80-110 km/h were observed across the entire province.

## **Provincial Climate Overview (September—November):**

### Temperature (Departure from Normal):

**Fall** temperatures averaged out to a little more than a degree above normal across the province. The main exceptions were noted in western Labrador, as well as the Bay St. George and Bay of Islands areas, which ended up with near normal temperatures for the Fall season.

September average temperatures exhibited a west to east pattern. Across most of Labrador, temperatures were roughly normal. Much of eastern Labrador, however, came in at roughly a degree above normal. Above normal conditions were much of the story for Newfoundland as well, with temperatures averaging out to about 1-2 degrees above normal. Bonavista had its 2nd warmest September on record, while both Cartwright and St. John's placed 4th all-time in 2020. The west was the exception for the island, as temperatures for the month were near normal.

**October** temperatures remained about a degree above normal for a portion of eastern Labrador and northeastern sections of Newfoundland. Bonavista continued to soak up the warmth, placing 4th all-time for warmest Octobers. Elsewhere in the province, temperatures came out to about normal, except in extreme western Labrador. There, temperatures ended up about a degree below normal.

**November** was generally a typical month for Newfoundland and Labrador in terms of temperatures, with a couple of localized areas being slightly above normal.

Right: Temperature anomalies based on observations for Newfoundland and Labrador for (from top) September-November combined, September, October, November



#### **Precipitation (Departure from Normal):**

**Fall** was generally near to drier than normal for Newfoundland. Near to wetter than normal conditions occurred in Labrador and across the southern Avalon Peninsula.

September precipitation varied from west to east in Newfoundland. For the western half of the island, conditions were generally 25-75% drier than normal. Deer Lake ended up with its 4th driest September on record. The story was quite different in the east, where about 25-75% more rainfall than normal occurred, aided mostly by Hurricane Sally's remnants. St. Lawrence endured its 5th wettest September recorded. In Labrador, about 25% less precipitation than normal fell in central areas. This area was surrounded by slightly wetter than normal conditions in the west, southeast, and north. About 25% higher than normal precipitation was noted for these areas.

**October** precipitation was about 25-50% higher than normal across interior Labrador, as well as the west coast of Newfoundland and southern Avalon Peninsula. In fact, Churchill Falls had its 2nd highest precipitation total on record for the month of October. Conditions were about 25% drier than normal across northeastern and central Newfoundland, as well as parts of the Labrador coast. Along with a top-5 warm October, Bonavista also had its 4th driest October on record. Precipitation was about normal elsewhere.

Precipitation in **November** was generally near to about 50% below normal across most of the province, with one major exception. <u>Record November snowfall</u> in central Labrador pushed this area to about 50-100% higher precipitation than normal for the month.

Right: Precipitation anomalies for Newfoundland and Labrador for (from top) September-November combined, September, October, November.



#### **Total Snowfall and Snow Depth**

For the fall season, interior Labrador received an estimated 100-170 cm of snow. Goose Bay ended up receiving nearly double its normal amount of snow for the Fall season thanks in large part to the <u>late-November blizzard</u>. Most coastal areas of Labrador from Nain to Cartwright received 60-100 cm, while southeastern Labrador fell in the 20-60 cm range for seasonal snowfall. In Newfoundland, in the area of the Long Range Mountains, an estimated 40-100 cm fell, with locally higher accumulations possible. Total snowfall elsewhere in Newfoundland ranged from 10-50 cm for the Fall.

At the end of November, all of Labrador had some snow on the ground. Estimated snow depths ranged from about 5-20 cm in the southeast to about 20-50 cm elsewhere in Labrador. The Upper Lake Melville area had an estimated 50-80 cm on the ground at the end of the month, based on observed values. For comparison, the long-term average for the end of the month at Goose Bay Airport is 20 cm. In Newfoundland, much of the Northern Peninsula and Long Range Mountain area had about 5-15 cm of snow on the ground. Other areas of the west had light amounts down, while the remainder of the island was snow-free at the end 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 2020

#### Sea Surface Temperature (Departure from Normal):

**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 may represent gaps in data.

September and October sea surface temperatures were generally about 1 to 4 °C warmer than average over most Newfoundland and Labrador waters. Exceptions to these warm conditions can be seen over the northern Gulf of St. Lawrence, where sea surface temperatures were about 1 to 3 °C colder than normal. A stretch of the Labrador Sea was also found to be roughly normal to about a degree below.

For **November**, sea surface temperatures continued to run warmer than normal over most waters by roughly 1-4 °C. The cold anomaly that was noted over the northern Gulf of St. Lawrence in the previous two months remained, but shifted slightly southward and diminished to about a degree below normal. Waters were also about a degree or two colder than normal off the northeast coast of Newfoundland.





NOAA monthly mean SST anomaly map (based on 1981-2010 Normals) for Sep 2020 (left), Oct 2020 (middle), and Nov 2020 (right) - https://www.nnvl.noaa.gov/view/globaldata.html#SSTA

# **2020 Hurricane Season:**

A historic 2020 Atlantic Hurricane season produced a staggering 30 named storms, with 6 of these forming into major hurricanes. For only the second time in history, the list of storm names ran into the Greek alphabet. The remnants of Hurricane Sally produced very heavy rainfall across eastern Newfoundland, leading to <u>several road washouts</u>. The other storm to have an impact in Atlantic Canada was <u>Teddy</u>, which made its way across eastern Nova Scotia in late September as a deep post-tropical storm. Aside from these, a few storms meandered near or just inside the Canadian Hurricane Centre's response zone, while a couple of other post-tropical remnants (Fay and Isaias) made their way into western Labrador over the Summer.

While the province was mostly spared this year, it was a record-setting season in terms of number of named storms (old record: 28 storms in 2005), as well as the number of named storms to make landfall in the continental U.S. (12, breaking the old record of 9). Areas in the Gulf of Mexico were hit particularly hard this season. For the 6th consecutive year, a named storm formed prior to June 1, also setting a record.



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)°	2020 Atlantic Tropical Cyclone Season				© Canadã
5°	the second second	Average	Actual		
	Named Storms:	12	30		
<b>0</b> *	Hurricanes:	6	13		
	Major Hurricanes:	3	6		
5*		A CONTRACTOR	Eller and the second		
	Arthur Hanna	Omar	Alpha	Theta	-
)°	Cristobal Isaas	Paulette	Beta	lota	
	Dolly Kylo	Rene	Gamma	-	
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Left: NOAA Preliminary Atlantic Tropical Cyclone tracks for the 2020 season (<u>https://www.nhc.noaa.gov/</u>) Above: CHC Tropical Cyclone season summary.

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

#### A few last breaths of summer:

As days started to get shorter, summer wanted to linger on for a little while longer across parts of the province. Above-normal temperatures persisted through September across most of the island, reaching a <u>crescendo right at the end of the month</u>. Daytime highs reached the <u>mid</u> to <u>upper</u>-20s across much of the island as September concluded. 20+ degree temperatures lasted into the early days of October, with generally warm conditions continuing periodically through the month, including a warm spell right in the middle for parts of both <u>Newfoundland</u> and <u>Labra-</u> dor. While temperatures reverted back to something closer to normal in November, there were still a few warm days in store for the island.

#### November storms, including a record-setter at the end:

While the later part of the Fall was quite normal in terms of temperature, it also had its usual share of storms, sparing no part of the province. An early-season snowfall event in late-October prompted the province to begin <u>allowing studded tires early for the winter season</u>. The activity continued early in November, with back-to-back storms within the first few days. The first gave mostly rain and wind to the province, and the second brought an <u>early season dose of snowfall to parts of eastern & central Newfoundland</u>. A couple more storms occurred in the middle of November, including an <u>accumulating snowfall event for the Avalon Peninsula</u>. After taking a breather, a mammoth snow storm made its way through Labrador. This storm gave central Labrador its own Snowmageddon of sorts, <u>bringing 75 cm of snow to the Upper Lake Melville area</u> and leading to school closures across most of the Big Land. The 75 cm reported at Goose Bay Airport represented daily record totals for each of November 23 and 24, and the daily record snowfall for all of November. The roughly 2-day event also exceeded the normal monthly snowfall for all of November for the Goose Bay area. This storm also cause some temporary closures to eastern parts of the Trans-Labrador Highway, northern parts of the South Labrador Highway, and the Cartwright Access Road. Storms throughout the Fall season caused the usual share of ferry disruptions and cancellations. These issues even contributed to a delay in re-opening Dominion stores after a roughly 4-month strike.

#### End of the forest fire season:

2020 marked four consecutive years of <u>below average forested land burned by wildfires</u>. The province mostly maintained low to moderate fire danger throughout September. Though there were a few days sprinkled in with high fire danger, as conditions were drier than normal across parts of the island. Newfoundland and Labrador had an estimated 90 wildland fires which burned roughly 4231 hectares of land up to September 30, both metrics falling below the 10-year average (109 and 30,655 respectively).

# **River Flows:**

By the end of September, most rivers across the province were near normal for flow rates. Despite this, Rocky River near Colinet reported excessive flow for the month. Many exceptions for below normal flow rates were observed for rivers in central and western Newfoundland, though there were a few rivers in the west that were running well above normal by the end of the month.

At the end of October, most rivers were still running at about normal rates. Several rivers across the northeast in Newfoundland were still showing below normal rates. A few rivers in Labrador bucked this trend, with flow rates at above normal levels. Overall, Eagle, Isle aux Morts, and Upper Humber Rivers all reported excessive flow for October.

As November came to a close, rivers across Labrador were running at well above normal flow rates. In Newfoundland, most rivers exhibited near to above normal rates of flow.



North America WaterWatch map of real-time streamflow compared to historical streamflow for the day of year: as of September 30 (left), October 30 (middle) & November 30 (right), 2020 - https://watermonitor.gov/naww/index.php

High

Much above

# **Drought Conditions:**

Drier than normal conditions were noted in September for parts of western Newfoundland, as well as central and mid coast Labrador. Moderate drought conditions were noted in extreme southwestern Newfoundland, in fact. These drought conditions did not persist through the remainder of the Fall, but an area of drier than normal conditions was observed across northeastern Newfoundland. These conditions continued for a portion of western Newfoundland through October and November. Otherwise, abnormally dry conditions were not observed.



Canadian Drought Monitor Map for September 30, 2020 (left), October 31, 2020 (middle), and November 30, 2020 (right). Drought maps courtesy of Agriculture and Agri-Food Canada- <u>http://www.agr.gc.ca/eng/programs-and-services/list-of-programs-and-services/drought-watchcanadian-drought-monitor/?</u> <u>id=1463575104513</u> Fall Season (Period: September-October-November) Temperature Outlook Performance: The temperature outlook for the Fall was em-

phatically predicting a warmer than normal Fall season.



Left: Probability of above, below and near normal: Produced August 31, 2020 – Right: Forecast Temperature Anomaly: Produced August 31, 2020

The temperature outlook worked out well for most of the island and for eastern Labrador. Otherwise, fall temperatures on average ended up being about normal across the rest of the province.



Above: Observed Temperature Anomaly – Issued on December 1, 2020

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

For Newfoundland, there is a moderate to high probability of a warmer than normal Winter season this year. In Labrador, a warmer than normal season is also predicted for areas south of Lake Melville, but with a low to moderate probability. The remainder of Labrador is predicted to have a normal Winter in terms of temperatures.

The precipitation forecast (not shown) anticipates higher than normal precipitation across the entire province. For Newfoundland, there is a moderate probability of these conditions, while the probability is moderate to high for Labrador. The seasonal precipitation forecast typically does not perform as well as the seasonal temperature forecast, so the graphics are not included.



Left: Probability of above, below and near normal temperature: Produced November 30, 2020 – Right: Temperature Anomaly Outlook: Produced November 30, 2020 https://weather.gc.ca/saisons/index\_e.html

#### **Temperature Outlook: Next 4 Weeks**

Newfoundland and Labrador had temperatures which were mildly to extremely warmer than normal during the first week of December. For the second week, temperatures started above normal but ended up closer to normal values. Overall, the result was decently captured by the Global Ensemble Prediction System. Here are the predictions for the next 4 weeks.

#### Week 1 (December 14 to 21):

Temperatures approaching the first official day of Winter are expected to be roughly normal across most of the province. There is a moderate probability of below normal temperatures for interior Labrador as we move towards the Winter Solstice.

#### Week 2 (December 21 to 28):

A flip of the script is expected during Christmas week. Temperatures are predicted to be above normal for the period, with a moderate probability. Parts of western and extreme northern Labrador are forecast to be roughly normal for much of the holidays.

Right: Forecast probability of above or below normal temperature from the Canadian Global Ensemble Prediction System for week 1 (top) & week 2 (bottom): Produced December 10, 2020



#### Week 3 (December 28 to January 4):

As we enter 2021, most of the province is still anticipated to be warmer than normal, with a moderate probability. A few pockets of near normal temperatures are expected in southwestern Newfoundland and interior Labrador.

#### Week 4 (January 4 to 11):

The story for Newfoundland remains unchanged through the early days of the new year. A moderate probability of above normal temperatures is predicted for most of the island, except near normal temperatures for the southwest. Interior Labrador is also still forecast to be near normal in terms of temperatures, while much of the coast shows a moderate probability of warmer than normal conditions.

*Right: Forecast probability of above or below normal temperature from the Canadian Global Ensemble Prediction System for week 3 (top) & week 4 (bottom): Produced December 10, 2020* 



#### Sea Ice Outlook—Winter Season (New):

By mid-**December**, the ice forecast from Canadian Ice Service anticipates some ice coverage along the mid and south Labrador coasts, as well as over Lake Melville. The lake is expected to be completely covered with consolidated first-year ice by the end of December.

Sea ice is expected to continue to progress south and eastward, covering the entire south Labrador coast and much of the Strait of Belle Isle by mid-**January**. The ice edge is expected to extend off the Northern Peninsula by this time and continue to expand through the season.

By mid-**February**, the ice edge is forecast to extend well off the northeast coast of Newfoundland, as well as across much of the Gulf of St. Lawrence. Ice is also expected along parts of the west coast, particularly in the Bay of Islands area. Ice concentrations of nine-tenths or higher are expected over many of these areas by the middle of the month. While the ice edge is not expected to reach the entire Newfoundland west coast by mid-February, it is expected to extend through Gulf-Port au Port and just into the Cabot Strait by late February or early March.

All forecast ice concentrations pictured below appear to be near to slightly below the 30-year median for ice concentrations at each given time.



Forecast ice concentrations for mid-December 2020 (left), mid-January 2021 (middle), and mid-February 2021 (right), from Canadian Ice Service: https://ice-glaces.ec.gc.cg/prods/OTLKGUE/20201201000000 OTLKGUE WINTER2020 0011345014.pdf

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