





Environnement et Changement climatique Canada

### Newfoundland and Labrador Quarterly Climate Summary: Winter 2019/20

#### Summary & significant weather events (December—February):

Winter 2019-20 was a story of yin and yang between Newfoundland and Labrador. While the island portion of the province saw a typical snow-filled season, Labrador experienced one of its least snowy winters in recent memory.

A typical December saw several storms which brought accumulating snow to much of the province. <u>The holiday season proved to be especially blustery</u> for much of the island, leading into an active start to 2020.

While January gave rise to one of the more memorable blizzards in the last few decades for the east coast of Newfoundland, it was a below-average month overall for snowfall across the remainder of the province. This was especially so in Labrador, where a few areas had among their five least snowy Januarys of all time.

Dry winter conditions would continue through February across Labrador, with a few cold outbreaks during the month. A number of storms brought more snow to the island, though overall it was a pretty typical February. Overall winter 2019-20 would be a boon to winter sports enthusiasts in Newfoundland.

#### Here is a description of the most significant events:

**December 3-4:** A storm tracked through the Gulf of St. Lawrence, bringing significant snowfall to southeast & central Labrador.

- **Snowfall**: 16 cm was reported in Goose Bay, while 14 cm accumulated in Blanc Sablon.
- Wind: Wreckhouse peaked at 122 km/h.

#### **December 5:** A roughly 6 hour period of heavy snow occurred in central Newfoundland.

• **Snowfall**: 6-hour snowfall amounts of 14 cm in Gander, 11 cm at Terra Nova, and 10 cm at La Scie and Millertown.

**December 10-11:** A deepening low pressure system passed west of Labrador and spread <u>heavy rain and strong winds across New-</u> foundland and the Labrador Strait. The remainder of the Labrador coast got snow, strong winds, and blowing snow with this system.

- **Rainfall:** 37.3 mm fell at Winterland, while 31 mm fell at Stephenville. 30 mm fell at both L'Anse au Loup and St. Lawrence.
- Snowfall: 21 cm was recorded in Nain.
- Wind: Peak gusts reported with this storm were 122 km/h at Wreckhouse, 113 km/h at Bonavista, 109 km/h at Makkovik, 107 km/h at Grates Cove and Nain, 102 km/h at Hopedale, and 100 km/h in St. John's.

**December 14-17:** An intense low pressure system tracked through central Labrador. The result was heavy snow in interior and northern Labrador, and a mix of wintry precipitation elsewhere. High waves and flooding were reported in parts of the west coast and the Burin Peninsula.

- Snowfall: Nain received 28 cm and Blanc Sablon reported 19 cm. Cormack reported an estimated 18 cm. Deer Lake, La Scie, and Millertown picked up 11-13 cm of snow.
- Rainfall: St. Lawrence received 69.1 mm, Port aux Basques 55.7 mm, and Winterland 55.2 mm. Other stations in western and central Newfoundland reported 20-43 mm.
- Wind: Wreckhouse peaked at 139 km/h, Bonavista hit 106 km/h, and Grates Cove clocked 100 km/h.

#### December 23-27: Two-part winter storm for Newfoundland for the holidays.

- Snowfall: Mount Pearl reported 37 cm, St. John's got 35 cm, and Bay Roberts and Terra Nova each received 33 cm. Snowfall amounts of 17 -30 cm were reported in Gander (two stations), Deer Lake, Paradise and Lethbridge.
- Wind: Bonavista peaked at 106 km/h, while stations in the northeast and across the Avalon Peninsula reported peak winds in the 80-97 km/h range.

January 5-6: An intense winter storm passed east of the island, bringing heavy snow and strong winds to eastern Newfoundland.

- Snowfall: The Avalon Peninsula was blanketed by 30-44 cm of snow. Grand Bank also received 30 cm, while St. Alban's reported 19 cm.
- Wind: Bonavista, St. Lawrence, and Twillingate all recorded peak wind gusts to 106 km/h. Grates Cove hit 104 km/h, while Burgeo, Cape Race, and St. John's peaked in the 93-98 km/h range.

January 8-9: A deepening low moved across eastern Newfoundland, and more high winds and snow affected Newfoundland.

- **Snowfall:** Wreckhouse got an estimated 18 cm, while stations across western and northeastern Newfoundland picked up 12-16 cm.
- Wind: Cape Pine reported a peak wind gust of 132 km/h and Twillingate hit 122 km/h. Stations elsewhere in southern and eastern New-foundland had peak gusts in the 90-120 km/h range.

**January 16-18:** The major blizzard coined "<u>Snowmageddon</u>." passed east of the Avalon Peninsula. (More information to be provided later in the bulletin.)

- Snowfall: Mount Pearl received 93 cm, Paradise 91 cm, and <u>St. John's 78-82 cm</u>. Mount Carmel reported 61 cm and Lethbridge picked up 48 cm, while two reports from Gander had 35 cm with this event. 31 cm was estimated at St. Lawrence as well.
- Wind: Green Island (Fortune Bay) hit a max gust of 171 km/h, while Bonavista hit 164 km/h. Wind gusts of 156 km/h were reported at Grates Cove and Heart's Delight-Islington. Stations all across eastern and southern Newfoundland recorded peak gusts in the 97-150 km/h range.

#### January 19-20: Another weaker system passed over eastern Newfoundland, piling on more snow across the island.

- Snowfall: Gander Airport and Gander West reported 19 and 18 cm, respectively. 11-17 cm was reported or estimated at stations across the northeast Avalon Peninsula, as well as Grand Falls-Windsor, Burgeo, Lethbridge, and St. Lawrence.
- Wind: Green Island (Fortune Bay) hit 143 km/h and Wreckhouse measured 107 km/h. Burgeo, Bonavista, and Port aux Basques peaked in the 90-99 km/h range.

January 27: Another low brought snow to northern Newfoundland and southeastern Labrador, and a wintry mix elsewhere on the island.

- Rainfall: Port aux Basques picked up 34.3 mm and Burgeo got 22.7 mm. Elsewhere in the southern half of the island, generally 8-15 mm was reported.
- **Snowfall:** 10 cm fell at Blanc Sablon.
- Wind: Wreckhouse recorded a peak gust of 109 km/h.

**February 2-3:** A winter storm tracked through central Newfoundland, bringing with it snow and strong winds to most of the island and southeastern Labrador, as well as significant rainfall to southeastern Newfoundland.

- **Snowfall:** Burgeo received an estimated 35 cm, while Stephenville and Winterland reported snowfall in the 20-23 cm range. Accumulations of 11-19 cm were reported across the remainder of the island, as well as the Labrador Strait.
- Rainfall: The Mount Pearl area received 27-28 mm of rain, and stations elsewhere on the Avalon and Burin Peninsulas received 19-20 mm.
- Wind: Gusts at Cartwright reached 108 km/h and Bonavista reached 105 km/h. Gusts elsewhere in Newfoundland and parts of the Labrador coast maxed out in the 80-104 km/h range.

**February 6-8:** Another low through central Newfoundland, another mix of precipitation for the island, including a <u>lengthy period of freezing</u> rain for the south and east. More snow was on the menu for the Labrador Strait.

- Snowfall: 35 cm of fresh snow fell in Deer Lake and 31 cm in Millertown. Stations elsewhere across the island, along with L'Anse au Loup, received 13-28 cm.
- Wind: Green Island (Fortune Bay) hit 134 km/h and Wreckhouse was close behind at 133 km/h. Stations all across the south and east coasts of Newfoundland recorded peaks in the 96-124 km/h range.

**February 10-11:** A trough of low pressure gave a brief shot of heavy snow to southwestern Newfoundland.

• **Snowfall:** Burgeo received an estimated 19 cm, Stephenville measured 17 cm, and Port aux Basques picked up 16.5 cm.

## **February 12:** Another deepening low was right on the heels of the previous system, and <u>more significant snow moved into eastern portions</u> of the island.

• Snowfall: <u>Nearly 19 cm was reported in St. John's</u>, and 17 cm was estimated at Terra Nova. Lethbridge, Gander, and Bonavista received snowfall in the 13-16 cm range.

**February 13-15:** The aforementioned storm deepened well offshore, ushering in strong winds, <u>cold temperatures</u>, and an extended period of very cold wind chills to the province.

• Coldest wind chills: Wind chill vales as low as -50 to -38 were reported across Labrador, and as low as -39 to -25 across Newfoundland.

February 19: Another wintry mix was on the menu for Newfoundland.

- Snowfall: 25 cm was observed in Deer Lake and 12 cm in Stephenville (both amounts including <u>flurries in the wake of the storm</u>). 10-15 cm was reported at L'Anse au loup and L'Anse au Clair.
- **Rainfall:** St. Lawrence got 24 mm and Winterland received 22.4 mm.
- Wind: 135 km/h peak wind at Wreckhouse, 109 km/h in St. John's, and 106 km/h in Bonavista. Stations elsewhere in southern and eastern Newfoundland reported peak gusts in the 80-90 km/h range.

#### February 27-28: Another storm brought a blustery conclusion to February.

- **Snowfall:** La Scie received an estimated 20 cm, while Burgeo and Sops Arm were estimated at 18 and 16 cm respectively. Several scattered stations on the island reported snowfall near 10-12 cm.
- Wind: Wreckhouse reported an extreme wind gust to 181 km/h. Green Island (Fortune Bay) hit 151 km/h, and Port aux Basques and Ramea hit 123 km/h and 121 km/h respectively. Stations elsewhere along the west, south, and east coasts reported peak wind gusts in the 87-109 km/h range.

#### **Provincial Climate Overview (December—February):**

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

The Winter temperatures averaged out to near normal across much of Newfoundland, except for the west and north where temperatures were roughly a degree above normal. In Labrador, a much milder than normal Winter was experienced, with temperatures 1 to 2 degrees above normal.

December average temperatures were near normal across most of Newfoundland. The Northern Peninsula and most of Labrador were 1 to 2 degrees above normal, while extreme northern Labrador was 2 to 3 degrees above normal. Makkovik (8th warmest), Nain (9th warmest), and L'Anse au Loup (10th warmest) all had top-10 warmest Decembers on record in 2019.

January average temperatures saw little change, as Newfoundland was roughly normal, while Labrador was 1 to 2 degrees above normal.

February average temperatures were once again near normal for most of the island, except for southwestern Newfoundland. There, temperatures were roughly 1 to 2 degrees above normal. Labrador also saw a roughly normal month, with extreme western and northern Labrador coming in at about a degree above and below normal, respectively.

Right: Temperature anomalies for Newfoundland and Labrador for (from top) December-February combined, December, January, February.

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#### **Precipitation (**Percent above/below Normal):

Winter precipitation was near normal for portions of Newfoundland, while much of the island received 10-30% below normal precipitation. A very dry Winter season occurred in Labrador, where roughly 25-75% less precipitation than normal fell.

**December** tried its best not to start out as a dry winter. The western half of Newfoundland picked up 10-50% above normal precipitation, as did southeastern, northern and western Labrador. Eastern Newfoundland, as well as central and mid-coastal Labrador, ended up with near to 25% drier than normal conditions.

January precipitation changed tune over most of the province. Most of Newfoundland received 10-50% below normal precipitation, while Labrador saw 50-100% less than normal. Blanc Sablon had its driest January on record, while Happy Valley-Goose Bay had its 2nd driest (and 2nd least snowy). The main exception to these dry conditions was, of course, the northern Avalon Peninsula and northeast coast. These areas received near to slightly above normal precipitation, thanks in large part to mid-January's blizzard. Though total precipitation was only slightly above normal, both St. John's and Lethbridge received roughly double their normal monthly snowfall totals, with St. John's recording its 3rd snowiest January since the late-1800's.

**February** was also quite dry across most of the province. 10-50% drier than normal conditions were noted across most of the island, while Labrador was again bone-dry, to the tune of 25-75% less precipitation than normal. Both Happy Valley-Goose Bay and Blanc Sablon recorded their 5th driest Februarys on record. The exception this month was western Newfoundland, which saw near normal to 50% above normal precipitation for the month.









Right: Precipitation anomalies for Newfoundland and Labrador for (from top) December-February combined, December, January, February.

#### Snow (Total / Percent above & below Normal):

In Newfoundland, total snowfall for the Winter season (December-February) was in the 200-360 cm range. Thanks to several significant east coast storms, Lethbridge had its 3rd snowiest winter on record, while St. John's experienced its 7th snowiest. The January 17 blizzard actually set a new single-day snowfall record for St. John's International Airport (76.2 cm, highest since records began at the site in 1942). This was not a single-day snowfall record for the St. John's area though; that honour remains with February 13, 1894, when 101.6 cm fell on the city. Total snowfall in Labrador was much lower than for the island, where totals ranged from 80 to 160 cm (though some areas along the coast may have received up to 200 cm total snow). Newfoundland received near normal to about 100 cm above normal snowfall for the Winter season. This was greatly contrasted by Labrador, which saw roughly 25 to 100 cm less snowfall than during a normal Winter. Happy Valley-Goose Bay had its 4th least snowy winter on record, while Blanc Sablon recorded its 5th least snowy. Both areas saw their lowest total winter snowfall since 2011.



Left: Total snowfall for select observation sites in Newfoundland and Labrador—December-February combined. Right: Snowfall anomalies (percent above/below normal) at observation sites in Newfoundland and Labrador for December-February combined.

#### **Snow depth**

Estimated snow depths in Newfoundland and Labrador at the end of February ranged from roughly 30 to 90 cm, except 100 to 140 cm across a portion of western Newfoundland and over the Mealy Mountains. Snow depths across Labrador were well below normal throughout January and February, staying in the 30 to 50 cm range through those two months. This was a big change from each of the past two winters for the Big Land, when total snowfall and snow depths were above normal through much of January and February. Observation sites in Newfoundland, however, reported above normal snow depths throughout January and February, staying in the low-100's for extended periods through the two months.



Snow depth (estimated) for Newfoundland and Labrador as of 8:30 am NST March 1, 2020

#### Sea Ice Coverage (Analysis / Concentration departure from normal):

Sea ice charts for the East Coast at the end of the Winter season show extensive ice cover along the Labrador Coast, in the Gulf of St. Lawrence, through the <u>Strait of Belle Isle</u>, and across the northeast coast of Newfoundland. However, all areas had below normal ice concentration for this time of year. The ice edge extends to just northeast of Bonavista Bay and eastward into Funk Island Bank, also with below normal concentration for these areas. Above normal concentration of sea ice can be found along parts of the west coast of Newfoundland and through the Cabot Strait, as well as into the southern Labrador Sea. The iceberg limit at the end of February was off the northern Avalon Peninsula and extended into the Northern Grand Banks.



Left: Sea ice analysis chart for February 24, 2020. Right: Sea ice concentration departure from normal: February 24, 2020

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

For **December, January, and February,** sea surface temperatures were generally about 1 to 4 °C warmer than average over most Newfoundland and Labrador waters. The only main exception was just off the south and east coasts of Newfoundland: there, sea surface temperatures were near normal through the winter season.



NOAA monthly mean SST anomaly map (based on 1981-2010 Normals) for Dec 2019 (left), Jan 2020 (middle), and Feb 2020 (right) - https://www.nnvl.noaa.gov/view/globaldata.html#SSTA

**Note:** The discussion excludes 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.

#### **Provincial Impacts (December—February):**

#### The storm called "Snowmageddon", and the train of east coast storms:

A period of active winter weather during the holiday season would prove to be an appetizer for a snow-filled and blustery January for much of eastern Newfoundland. The cherry on top of the winter cavalcade would be the January 17 blizzard. Record-setting snowfall and <u>ex-treme winds</u> invaded the east coast, in particular the St. John's Metro area. This major storm also brought <u>damaging wave and storm surge conditions to coastal areas in the east and northeast</u>, and the extreme heavy snowfall created an <u>avalanche on the Outer Battery</u> in St. John's. Many municipalities in the northeast Avalon had <u>states of emergency</u> in effect for <u>roughly a week after the storm</u>, as military response was required to aid in clean-up efforts. These efforts were interrupted by another storm closely on the heels of the blizzard, bringing yet more snow to the area. Flights remained grounded for several days, and shops and schools remained closed while the clean-up efforts continued.

The January 17 storm wasn't the only one to cause damage. An intense mid-December storm brought <u>blizzard conditions</u> to much of the island. This storm also brought high waves and storm surge, which caused <u>damage in the Bonne Bay area</u> and on <u>the Burin Peninsula</u>. The high water levels with this dangerous storm triggered <u>a state of emergency in Trout River</u>. This storm brought all the seasons to the Avalon Peninsula, as <u>record high temperatures were chased out by snow squall conditions</u>. As a whole, the stormy winter would also be blamed for a <u>massive</u> salmon die-off near Bay d'Espoir.

#### Winter (mostly) M.I.A. in Labrador:

While eastern Newfoundland dug itself out, Labrador remained fairly quiet in terms of winter weather. A relatively mild winter, unreliable ice conditions, and a lack of snow did lead to some <u>impacts for winter weather sports</u> in the mainland portion of the province. Though the winter season was generally milder than normal, several bitterly cold wind chill events did occur.

#### Harsh travel conditions, especially for ferries:

Another winter and another rough season for travel and shipping. Stormy weather meant long delays to cross the Cabot Strait. Numerous cancellations and travel advisories, for travel both by sea and air, occurred as the storm after storm made their way to the island, which was certainly <u>unwelcome around the holiday season</u>. The Strait of Belle Isle was no stranger to poor sea conditions, though <u>sea ice was mostly to blame</u> as the winter dragged on. Impacts were felt off and on through the winter for other areas of the island serviced by ferry as well.

#### **River Flows / Drought Conditions:**

River flow rates in Newfoundland and Labrador were near to above normal for the month of December, with several rivers in Newfoundland reporting excessive flow. This was aided by a higher than normal month in terms of precipitation. Flows for January switched to near to below normal. The Gander and Rocky Rivers reported deficient flow for the month, which was likely in response to a lack of precipitation. February had a wide range of results for river flows, with well below normal flow rates for Isle aux Morts and Gander Rivers. Gander River reported deficient flow for February. Contrasting these results, Eagle and Rocky Rivers reported excessive flow rates for the month.



E - Excessive D - Deficient R - Record

03QC001	10900	KM2		
GANDER			234	202
02YQ001	4400	KM2	E	
ISLE AUX MORTS			20.5	186
02ZB001	205	KM2	E	
ROCKY			15.6	107
02ZK001	301	KM2		
UPPER HUMBER			95.5	231
02YL001	2110	KM2	E	
STATION	DRAINAGE		MEAN FLO	% OF
NUMBER	AR	EA	(M3/S)	MEDIAN
EAGLE			64	114

MEAN FLO

(M3/S)

79.5

% OF

MEDIAN

86

STATION

NUMBER

EAGLE

DRAINAGE

AREA

NUMBER	AREA		(M3/S)	MEDIAN
EAGLE			64	114
03QC001	10900	KM2		
GANDER			52.3	58
02YQ001	4400	KM2	D	
ISLE AUX MORTS			5.41	113
02ZB001	205	KM2		
ROCKY			4.8	35
02ZK001	301	KM2	D	
UPPER HUMBER			23.5	90
02YL001	2110	KM2		

STATION	DRAINAGE		MEAN FLO		% OF
NUMBER	AREA			(M3/S)	MEDIAN
EAGLE				53.5	136
03QC001	10900	KM2		E	
GANDER				32.3	47
02YQ001	4400	KM2		D	
ISLE AUX MORTS				2.41	67
02ZB001	205	KM2			
ROCKY				20	171
02ZK001	301	KM2		E	
UPPER HUMBER				18	115
02YL001	2110	KM2			

Right: Monthly runoff summary for select river sites in Newfoundland and Labrador (map above) for Dec. 2019 (top), Jan. 2020 (middle), and Feb. 2020 (bottom) - tables courtesy of ECCC Water Survey of Canada December and January in western Labrador were classified as abnormally dry. Well below normal precipitation across Labrador led to a spread in abnormally dry conditions to central and northern Labrador in February. Otherwise, abnormally dry conditions were not analyzed throughout the winter.



Canadian Drought Monitor Map for December 31, 2019 (left), January 31, 2020 (middle), and February 29, 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> Winter Season (Period: December-January-February) Temperature Outlook Performance: For the most part, winter in Newfoundland and Labrador was forecast to be roughly normal to slightly milder than normal.



Left: Probability of above, below and near normal: Produced November 30, 2019 – Right: Forecast Temperature Anomaly: Produced November 30, 2019

Overall, the forecast worked out relatively well. Newfoundland and Labrador saw a roughly average to slightly above average winter in terms of temperature.



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

#### Spring Season (Period: March-April-May) Temperature / Precipitation Outlook:

The Spring temperature outlook for Newfoundland and Labrador differs between the island and mainland portions of the province. Newfoundland has a moderate chance of a near normal season in terms of temperature, while Labrador has a moderate chance of a warmer than normal Spring.

The precipitation forecast (not shown) has a moderate chance of a wetter than normal Spring in western Labrador and a moderate chance of a drier than normal season in southeastern Labrador. Otherwise, there is no signal over the province. 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 February 28, 2020 – Right: Temperature Anomaly Outlook: Produced February 28, 2020 https://weather.gc.ca/saisons/index\_e.html

#### Temperature Outlook: Next 4 Weeks

Temperatures across the province were generally near to slightly below normal in Newfoundland for the first week of March, while Labrador was near to slightly above normal. Both areas were below normal in terms of temperatures for the second week. Our Global Ensemble Prediction System forecast below normal temperatures across the province for both the first two weeks of March.

#### Week 1 (March 16 to 23):

Temperatures into the first official days of Spring are expected to be below normal across much of Newfoundland and Labrador, with a moderate to high probability.

#### Week 2 (March 23 to 30):

The cold trend is forecast to continue for most of the province, with a moderate probability of colder than normal temperatures. Portions of central Newfoundland and extreme western Labrador are anticipated to have near normal temperatures.





#### Week 3 (March 30 to April 6):

Colder than normal temperatures are expected to continue into April. A moderate chance of below normal temperatures are forecast for Labrador, while a moderate to high chance of such conditions is in place for Newfound-land.

#### Week 4 (April 6 to 13):

Cold temperatures are forecast to persist through Easter weekend. A moderate to high probability of below normal temperatures is anticipated for the province as we proceed through April.

*Right: Forecast probability of above or below normal temperature from the Canadian Global Ensemble Prediction System for week 3 (top) & week 4 (bottom): Produced March 12, 2020* 



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