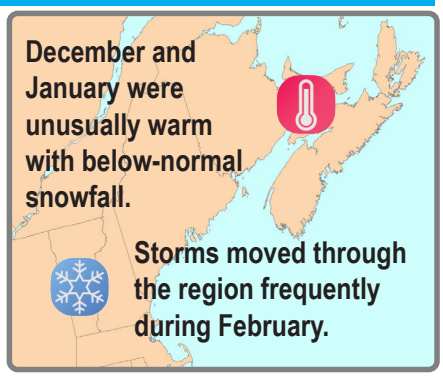
Quarterly Climate Impacts and Outlook

Gulf of Maine Region

March 2021

Gulf of Maine Significant Events – *December 2020–February 2021*

Drought conditions improved in most of the region during **December**; however, abnormal **dryness lingered** through **January** and **February**. See Regional Impacts for details.



December

December was mild, with two periods of **unusual warmth**. On **December 1**, temperatures were as high as 17°C (63°F) causing seven New Brunswick sites including Fredericton, Miramichi, and Oromocto to have their **warmest December day** on record. Caribou, ME, recorded its **warmest high and low temperatures of any winter**. Temperatures on **December 25** were as high as 17.8°C (64.0°F). Fredericton and Oromocto had their **warmest December day**, a record that had just been set earlier in the month. Many places in the Maritimes, as well as Caribou, ME, saw their warmest Christmas on record. In fact, it was a green Christmas for most of the Maritimes, where a white Christmas is becoming rarer. This was the **warmest December** for several Maritimes sites including Halifax, N.S., and among the five warmest Decembers for most of the rest of the Maritimes and Caribou, ME. Three of Caribou's 10 warmest December days on record occurred this December. The month's warm temperatures led to **snowfall deficits** in many areas and contributed to a delay in the ski season in the Maritimes. There were **two notable storms** in December, a nor'easter that brought rain, snow, and gusty winds to the region from **December 5 to 6** and a storm that dropped heavy snow on parts of New England from **December 16 to 17**. See Regional Impacts for details.

January

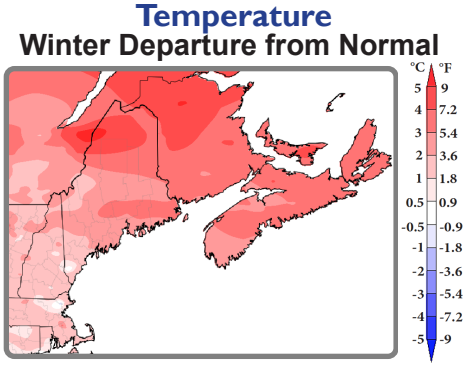
January was also **unusually warm**, particularly in Maine and the Maritimes. The North Cape, P.E.I., area recorded its **warmest January** on record. This January ranked among the **five warmest on record** for most Maritimes sites and Caribou, ME, and among the 10 warmest Januaries for Portland, ME. There were **few significant storms** in January, leading to **drier-than-normal** conditions and **below-normal snowfall** for many locations. Several New Brunswick and Nova Scotia sites had one of their **10 driest Januaries**.

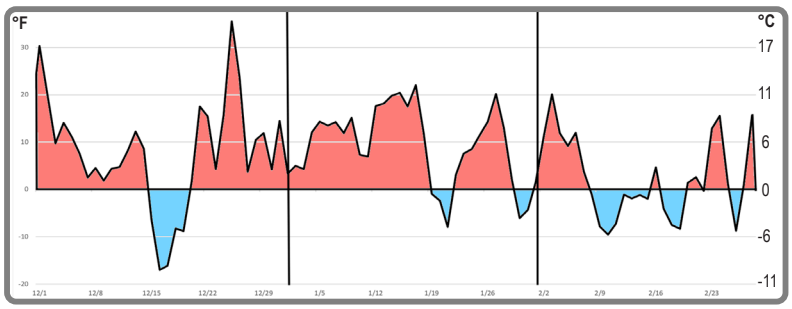
February

The Gulf of Maine region did not experience the record-setting cold conditions that the central U.S. and much of Canada saw as the polar jet stream plunged south during February. In fact, this February ranked among the **10 warmest** on record for several Maritimes sites. However, the **jet stream frequently steered storms** through the Gulf of Maine region. For instance, a nor'easter brought **heavy snow and strong winds** to parts of the region from **February 1 to 3**, while a storm from **February 7 to 8** dropped **heavy snow** on the Maritimes. See Regional Impacts for details.

This **winter** was the **warmest on record** for Fredericton and Moncton, N.B.; Halifax (Shearwater) area, N.S.; and Charlottetown, P.E.I. and among the warmest winters on record for many other locations in the Maritimes. In addition, Caribou, ME, had its third-warmest winter.

Regional Climate Overview – *December 2020–February 2021*





Daily average temperature departure from normal during winter at Caribou, ME. Warmer-than-normal days are shaded red and colder-than-normal days are shaded blue.

Winter (averaged over December, January, and February) was up to 5°C (9°F) **warmer than normal***. **December** was as much as 5°C (9°F) **warmer than normal**, with the warmest locations in the Maritimes and northern Maine. **January** temperatures were as much as 6°C (11°F) **warmer than normal**, with the warmest locations in New Brunswick and Maine. **February** temperatures ranged from 2°C (4°F) in western Maine to 4°C (7°F) above normal in Cape Breton, N.S.

*Temperature normals based on 1981–2010 data.

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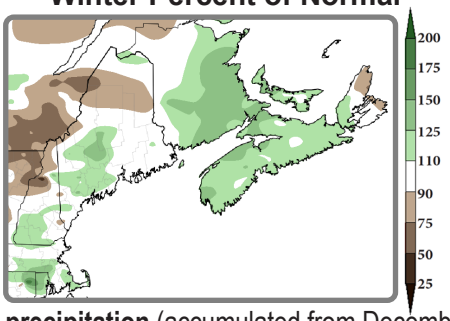
Regional Climate Overview – *December 2020–February 2021*

Precipitation
Winter Percent of Normal

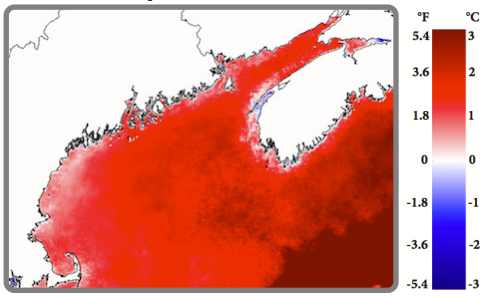


U.S. precipitation normals based on 1981–2010 data; Canadian precipitation averages based on 2002–2020 data.

SST normals based on 1985–2014 data

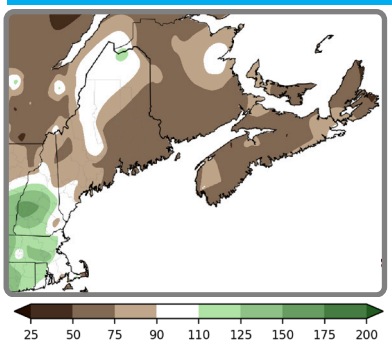
Winter precipitation (accumulated from December to February) ranged from 50% of normal to 150% of normal. **December precipitation** ranged from 50% of normal to more than 200% of normal, with much of the region seeing near- or above-normal precipitation. Some New Brunswick sites had one of their 10 wettest Decembers on record. **January** was **dry** with precipitation ranging from 25% of normal to near normal for most areas. **February precipitation** ranged from 75% of normal in parts of New England to 200% of normal in northern Maine and the Maritimes. Ingonish Beach and Malay Falls, N.S., had their second-wettest February on record.

Sea Surface Temperature
Winter Departure from Normal



Sea surface temperatures over the entire Gulf of Maine were **strongly above normal** for the **winter** season. Anomalies were strongest over the Scotian Shelf at greater than 2.5°C (4.5°F) and the deeper basins of the western Gulf at greater than 2.0°C (3.6°F). Positive anomalies were less than 1.0°C (1.8°F) only along the extreme western edge of the Gulf. The Gulf's winter sea surface temperature ranked as the **fourth warmest on record** (since 1985).

Regional Impacts – *December 2020–February 2021*



Winter percent of normal snowfall.

Winter Conditions

From **December 5 to 7**, a **rapidly intensifying nor'easter** brought up to 102 mm (4 in.) of **rain** to eastern Massachusetts, southern New Brunswick, and parts of Nova Scotia and up to 38 cm (15 in.) of **snow** to northern New Brunswick and the rest of New England. Wind gusts of up to 109 km/h (68 mph) contributed to power outages across the region including around 230,000 customers in Maine—more than a quarter of the state. A storm from **December 16 to 17** dropped up to 122 cm (48 in.) of snow in southern New Hampshire, up to 71 cm (28 in.) in southern Maine, and up to 41 cm (16 in.) in eastern Massachusetts, with snowfall rates of over 13 cm (5 in.) per hour. Concord, NH, had its **all-time snowiest day** on record and **largest December snowstorm**, while Portland, ME, and Boston, MA, had one of their 10 biggest December snowstorms. Parts of New England wrapped up December with above-normal snowfall due to the storm, with Concord having one of its 10 snowiest Decembers. However, much of the **Maritimes** saw **below-normal December snowfall**.

A storm from **January 16 to 17** brought up to 38 cm (15 in.) of **snow** to northern parts of New Brunswick, Maine, and New Hampshire and up to 55 mm (2 in.) of **rain** to the rest of the region. Rain and melting snow led to flooding in some locations. With few storms and above-normal temperatures, **January snowfall** was **below or much below normal** for most areas. This January was among the **10 least snowy** on record for Caribou, ME; Concord, NH; Saint John, N.B.; and Yarmouth, N.S. Little snow cover led to a slow start to the snowmobile season. Thin ice and open waterways created unsafe conditions for snowmobiling and ice fishing. The Saint John River in Fredericton, N.B., froze over on January 20, the **second latest date** since 1965, making the 2020–2021 open water season the fourth-longest on record at the site. In early January, a **lack of ice** in the Bay of Chaleur, N.B., allowed hundreds of harp seals to drift unusually far into the bay. In late January, ice coverage in the Gulf of St. Lawrence was around 1.6%, the **lowest in over 50 years** of records.

From **February 1 to 3**, a **nor'easter** dropped up to 56 cm (22 in.) of snow on the region, with the greatest amounts in northeastern Massachusetts, while parts of Nova Scotia saw over 70 mm (3 in.) of rain. Wind gusts of up to 100 km/h (62 mph) led to power outages. **Coastal flooding** in Massachusetts inundated roads and low-lying areas and contributed to the partial collapse of three seasonal homes. From **February 7 to 8**, a storm brought up to 50 cm (20 in.) of **snow and strong winds** to the Maritimes, closing schools and cancelling postal service. A storm from **February 15 to 17** produced up to 15 mm (0.60 in.) of freezing rain, 10 cm (4 in.) of sleet, and 25 cm (10 in.) of snow in the region, creating hazardous travel conditions. With frequent storms, **February snowfall** was **near or above normal** for most areas, with Caribou, ME, having its 10th-snowiest February. In early February, the water equivalent of the snow pack in the Saint John River basin was only 28% of normal but that increased to 70% of normal by early March. Ice coverage in the Gulf of St. Lawrence was around **six weeks behind normal** by late February. The lack of ice can lead to shoreline erosion, damage to the fisheries, more seals on shore, and dangerous ice fishing conditions. **Winter snowfall** ranged from 25% of normal in Cape Breton, N.S., to 175% of normal in western New Hampshire (map above).

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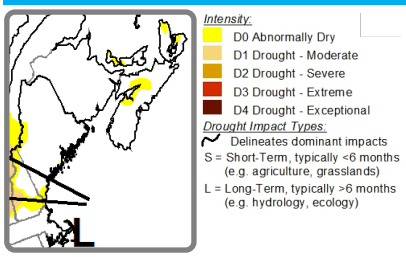
Regional Impacts – *December 2020–February 2021*



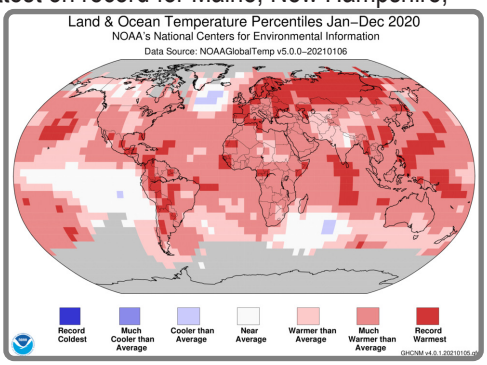
North American Drought Monitor from February 28, 2021.

Drought Conditions

Wetter-than-normal weather during **December eased drought conditions** in all parts of the region except New Hampshire. Areas of abnormal dryness were reduced but persisted throughout the region, except in Massachusetts. During **January**, there was **little change** in conditions. With below-normal precipitation, moderate drought lingered in New Hampshire and abnormal dryness lingered, and even expanded slightly, in the rest of the region. During **February**, **dry conditions improved** in parts of the Maritimes but were unchanged in New England. As of late February, **dryness persisted** in parts of Maine, New Hampshire, Nova Scotia, and P.E.I.

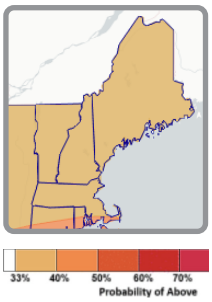
2020 Warmth

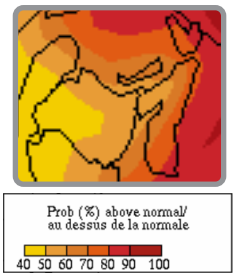
2020 ranked among the **hottest years on record** for the Maritimes and among the five hottest on record for Maine, New Hampshire, and Massachusetts. In fact, Portland, ME, had its **hottest year**, while Caribou, ME, had its second hottest and Yarmouth, N.S., had its third hottest. The year was among the 10 hottest on record for several other sites including Concord, NH; Boston, MA; Halifax, N.S.; Fredericton, N.B.; and Charlottetown, P.E.I. In addition, 2020 ranked among the **hottest years on record** for the globe. **Ocean temperatures** were also **exceptionally warm**, with the 2020 global sea surface temperature ranking as third hottest and the 2020 Northern Hemisphere ocean temperature ranking as **hottest on record**. These warm ocean temperatures contributed to a record-setting 2020 Atlantic hurricane season. Deep-water temperatures in the Gulf of St. Lawrence reached their **highest temperatures since records started** in 1915, which will likely have implications for the ecosystem.



Regional Outlook – *Spring 2021*

Temperature and Precipitation



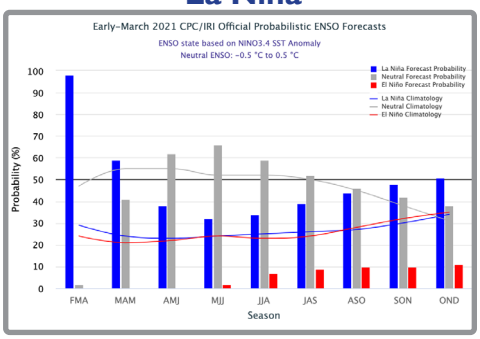


CPC temperature map (above left) produced February 18.

ECCC temperature map (above right) produced February 28.

For **March–May**, NOAA's Climate Prediction Center (CPC) and Environment and Climate Change Canada (ECCC) favor **above-normal temperatures** for the entire region. CPC predicts an increased likelihood of **above-normal precipitation** for northern New Hampshire and much of Maine, while ECCC favors **below-normal precipitation** for most of New Brunswick, western/northern Nova Scotia, and western P.E.I. **Equal chances** of below-, near-, or above-normal precipitation are forecast for the rest of the region. With an increased likelihood of wetter-than-normal conditions for the rest of March and April–June, **easing of drought conditions** is expected in New Hampshire.

La Niña



During February, **La Niña conditions** continued in the equatorial Pacific Ocean. NOAA's Climate Prediction Center indicates there is around a 60% chance La Niña conditions **will transition to ENSO-neutral conditions** during spring, with ENSO-neutral conditions likely continuing through summer.

Spring Flood Potential

NOAA indicates the **flood risk** during spring is **near normal** for most of New England and **below normal** for parts of New Hampshire and Maine where dry conditions exist. The **ice jam flooding potential** is also **below normal** or **near normal**. Very heavy rain can cause flooding at any time of the year, even in areas that have little to no snow cover.

New Brunswick's River Watch program, which monitors water levels along the St. John River and its tributaries, launched on March 10.

Contacts

National Oceanic and Atmospheric Administration

Environment and Climate Change Canada

Northeast Regional Climate Center

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Gulf of Maine Partners

Gulf of Maine Council on the Marine Environment, Climate Network

University of Maine, School of Marine Sciences

State Climatologists

National Integrated Drought Information System

Northeast Regional Association of Coastal Ocean Observing Systems

Gulf of Maine Research Institute

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