



Gulf of Maine Significant Events – December 2023–February 2024

Winter was **record warm** for a few sites like Caribou, ME; Fredericton, N.B.; and Summerside, P.E.I., and ranked among the **10 warmest** for multiple areas. Warm winters like this one, with **fewer days** for ice skating on outdoor ponds, caused Halifax, N.S., to [discontinue its ice thickness testing program](#). Much of the season's **precipitation fell as rain instead of snow**. Winter was the fourth wettest for Concord, NH, but among the 10 least snowy for Caribou, ME, and Boston, MA. The winter conditions led to an [early start](#) of the maple season, caused events like the [Can-Am Crown International Sled Dog Race](#) and [World Pond Hockey Championship](#) to be cancelled, and limited [ice fishing and snowmobiling activities](#).

December

December was **unusually warm**, ranking as the **warmest December** for Fredericton, N.B., and among the five warmest for multiple sites including Boston, MA; Caribou, ME; Moncton, N.B.; and Charlottetown, P.E.I. December featured below- or near-normal precipitation for most of the Maritimes, with Summerside, P.E.I., having its **fifth-driest December**, but was wet in New England, where Concord, NH, had its **fifth-wettest December**. With warm temperatures, much of the precipitation fell as rain instead of snow resulting in [snowfall deficits for most areas](#). December was among the **10 least snowy** for Boston, MA; Portland, ME; and Caribou, ME. There were a few notable storms, with a major system in mid-December bringing mild air, heavy rain, **severe flooding**, and **damaging winds** to the region. On **December 18**, Charlo, N.B., had its **warmest December high temperature** of 17.2°C (63°F), while Caribou tied its second warmest high for December at 14°C (58°F). December 18 was also Concord's second-wettest December day with 69.3 mm (2.73 in.) of precipitation.

January

January was **warmer than normal**, ranking among the **10 warmest Januarys** for sites such as Portland, ME, and Bas-Caraquet and Charlo, N.B. There were **several storms** that brought a **mix of precipitation types**. Back-to-back powerful storms during the first half of January produced unusually high water levels along the coast, with **record levels** in Maine causing **significant flooding and extensive damage**. During one of the storms, on **January 13**, Portland had its fourth-wettest January day with 61.7 mm (2.43 in.) of precipitation. This January was among the **five wettest** for several sites including Boston, MA; Concord, NH; and Portland. However, the Maritimes were **drier than normal** and **snowfall amounts varied** across the region.

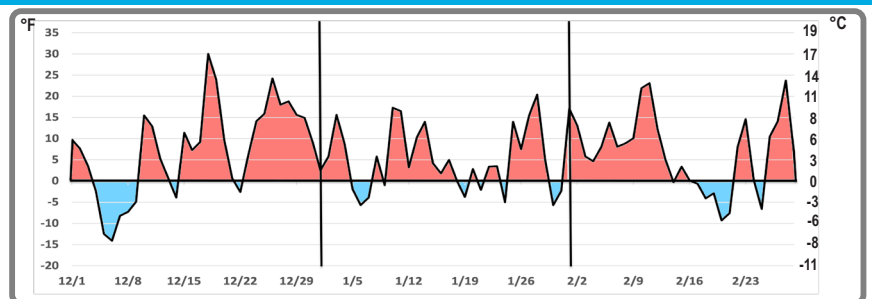
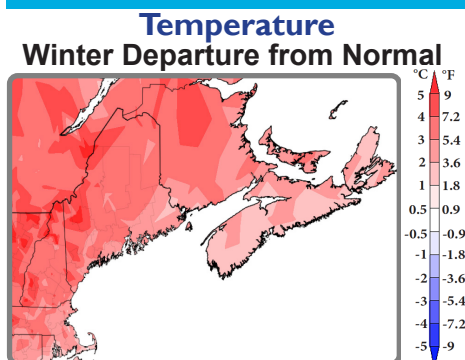
February

February was another **warm month**, ranking among the **10 warmest Februarys** for several sites including Caribou, ME; Concord, NH; Fredericton, N.B.; and Summerside, P.E.I. There were limited storms, leading this February to be among the **10 driest** for a few sites including Portland, ME, and Boston, MA, and among the **10 least snowy** for sites like Caribou and Portland, ME, and Bas-Caraquet and Saint John, N.B. However, a multiday snow event early in the month in the eastern Maritimes led this February to be the **snowiest on record** for Halifax, N.S., and the **third snowiest** for Sydney, N.S. Ice on the Saint John River at Fredericton, N.B., broke up on **February 27**, resulting in the **third shortest ice season** since 1825.

Dec, Jan, and Feb were **unusually mild**, with the overall average record warm at some sites.

Several powerful storms hit the region during winter producing significant damage, especially in Maine.

Regional Climate Overview – December 2023–February 2024



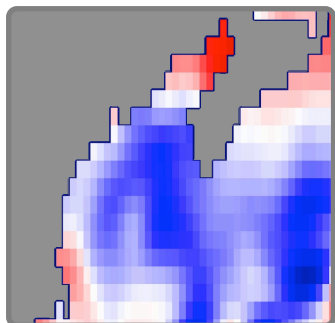
Daily average temperature departure from normal during winter at Caribou, ME. Warmer-than-normal days are shaded red and colder-than-normal days are shaded blue.

Winter (averaged over December, January, and February) was up to 5°C (9°F) **warmer than normal***, ranking as the **warmest on record** for a few sites like Caribou, ME, and Fredericton, N.B., and among the **10 warmest** for multiple areas. **December** was up to 5°C (9°F) **warmer than normal**, ranking as the **warmest December** on record for Fredericton, N.B., and among the five warmest for multiple sites. **January** was up to 4°C (7°F) **warmer than normal**, ranking among the 10 warmest for a few sites. **February** was up to 5°C (9°F) **warmer than normal**, ranking among 10 warmest for several sites in the region.

*Normals based on 1991–2020 data.

Regional Climate Overview – December 2023–February 2024

Winter Departure from Normal

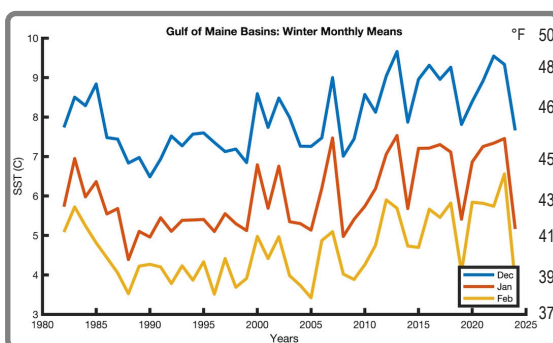


Sea Surface Temperature

Winter sea surface temperature anomalies were as much as -1.5°C (2.7°F) **below normal*** over most of the deeper basins in the Gulf of Maine. Preliminary findings indicate these colder temperatures began with strong wind mixing associated with post-tropical storm Lee in mid-September that eroded the surface warm layer. Subsequently, it is thought that lower surface salinities and temperatures associated with changes in Scotian Shelf water entering the Gulf produced

a relatively stable winter surface layer that further cooled under atmospheric influence. Meanwhile, winter sea surface temperature anomalies were around 0.7°C (1.3°F) **above normal** off the Massachusetts coast, 0.1°C to 0.8°C (0.2°F to 1.4°F) above normal along the Scotian Shelf, and near 1.5°C (2.7°F) above normal in the upper Bay of Fundy.

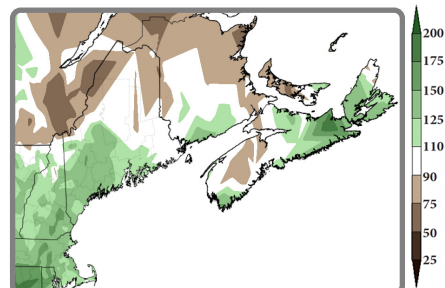
Winter monthly mean sea surface temperatures, averaged over the Gulf of Maine deep basins, showed December, January, and February all to be colder than the previous nine years and significantly colder than the previous four years (graph right). While December was average, it was the **ninth-coldest January** and the **seventh-coldest February**, all based on data from 1982 to 2024.



Map and graph: University of Maine School of Marine Sciences

*SST normals based on 1991–2020 data.

Precipitation Winter Percent of Normal



Precipitation for winter (accumulated from December to February) ranged from 50% of normal* to more than 200% of normal. **December** precipitation ranged from 25% of normal in P.E.I. to over 200% of normal in Maine. This December was the **fifth driest** for Summerside, P.E.I., but the **fifth wettest** for Concord, NH. **January** precipitation ranged from 25% of normal in Cape Breton, N.S., to over 200% of normal in coastal New England where it was among the **five wettest**. **February** precipitation ranged from less than 25% of normal in New England, among the 10 driest for a few sites, to 150% of normal in parts of Nova Scotia.

*Precipitation normals based on 1991–2020 data.

Regional Impacts – December 2023–February 2024



Many trees were downed in Maine during the mid-December storm. Credit: Andy Thomas

Winter Storms

A strong storm from **December 17 to 19** brought warm, unusually moist air into the region. Charlo, N.B., saw its **highest December temperature**. Precipitation totals, mostly in the form of rain, were up to 150 mm (6 in.), greatest in New England, with December 18 becoming Concord, NH's second-wettest December day. Rain falling on melting snowpack and frozen ground contributed to **extreme runoff** in New Hampshire and Maine, where [several waterways](#) reached **record or near-record high water levels**. Floodwaters [inundated buildings and roads](#), resulting in [water rescues and evacuations](#) and causing [at least \\$20 million in damage](#) in Maine. Wind gusts of up to 116 km/h (72 mph), with [locally higher gusts](#), damaged roofs and [downed trees and wires](#), with Maine's logging industry seeing [losses of over \\$2.5 million](#). **More than 400,000 customers** in Maine, [roughly half the state](#), and over 240,000 customers in Massachusetts lost power, some for a few days. Over 200,000 customers in the Maritimes lost power, including 129,000 in New Brunswick, making it **one of the largest restoration efforts** in N.B. Power's history and costing the company [millions of dollars](#). The storm resulted in at least **four fatalities**.

Back-to-back powerful storms from **January 9 to 14** dropped both snow and heavy rain, causing [localized flooding](#). [Strong winds](#), with gusts on January 9 and 10 of up to 118 km/h (73 mph) and a Les Suêtes wind gust to 174 km/h (108 mph), [disrupted travel](#) and downed trees and power lines, causing power outages. Both storms also brought **unusually high water levels to the region's coastlines**. On **January 10**, tidal water levels were **record high** at Bar Harbor, ME and [among the five highest](#) at [Portland, ME](#), and Boston, MA. Tidal water levels on **January 13** surpassed those of a few days prior, with Bar Harbor and Portland **reaching their all-time highest water levels on record** and Boston seeing its [fourth highest water level](#). **Significant coastal flooding** caused **extensive damage to roads, buildings, and sea walls**, with some [homes condemned](#) and other structures [completely destroyed](#) or [washed away](#). Tourist attractions in Maine such as [historic lighthouse buildings](#) and [Acadia National Park](#) also suffered major damage. The flooding led to multiple [water rescues](#) and evacuations. In Maine, the storms caused [over \\$70 million in damage](#) to public infrastructure and was expected to have [substantial financial implications](#) for the state's **fishing industry**.

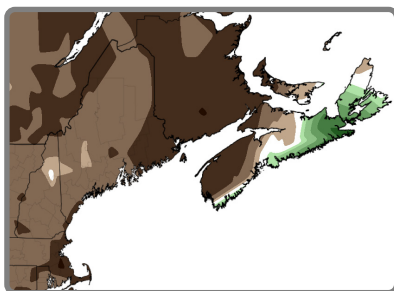


Damage in coastal Massachusetts in mid-January. Credit: [Essex County Storm Report/MyCoast MA](#)

Regional Impacts – December 2023–February 2024

Winter Storms Continued

A historic, multi-day snowfall event occurred in the Maritimes from **February 2 to 5** when [a stalled storm](#) dropped up to 65 cm (26 in.) of snow on eastern P.E.I. and central Nova Scotia and **up to 150 cm (59 in.)** in Cape Breton, N.S. Wind gusts of up to 80 km/h (50 mph), mostly in coastal areas, caused whiteout conditions and power outages. Storm impacts included [damaged windows](#) and roofs, difficult travel with [vehicles becoming stranded](#), and [many school and business closures](#). Two storms between **February 23 and 29** brought mild temperatures, rain, and gusty winds to the Maritimes. Heavy rain, combined with rapid snowmelt in some areas, led to **flooding** that [made roads impassable](#) and [resulted in some evacuations](#), particularly in Sussex, N.B. [Power outages](#) were also noted.



Winter snowfall ranged from 25% of normal* to more than 200% of normal.

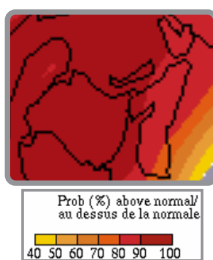
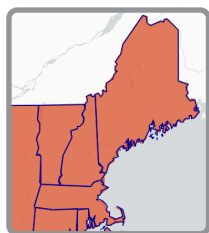
*Normals based on 1991–2020 data

Winter Snowfall

Warm temperatures in **December** led to a **lack of snow** across the region, ranking among the **10 least snowy Decembers** for Boston, MA, and Portland and Caribou, ME. **End-of-December snow depth was well below normal** for most of Maritimes. **January snowfall** and Maritimes **end-of-month snow depth** were **variable**. For instance, there were notable snowfall deficits across much of the Maritimes and southeastern Massachusetts, but western Maine and most of New Hampshire had a snowfall surplus. **February snowfall** was **below normal** in New England and southwestern New Brunswick, ranking among the **10 least snowy Februaries** for several sites including Portland and Caribou, ME; Boston, MA; and Bas-Caraquet and Saint John, N.B. However, the early February snow event in the eastern Maritimes pushed **monthly snow totals above normal** there, with Halifax, N.S., having its **snowiest February on record** and Sydney, N.S., having its third snowiest. Warm temperatures at month's end melted the snow, leaving **end-of-month snow depth below normal** in the Maritimes.

Regional Outlook – Spring 2024

Temperature and Precipitation



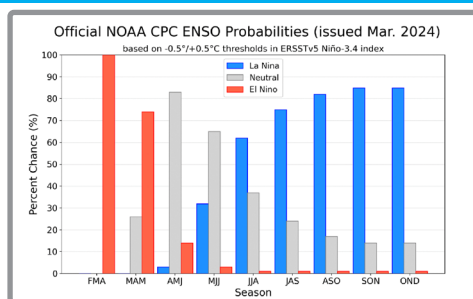
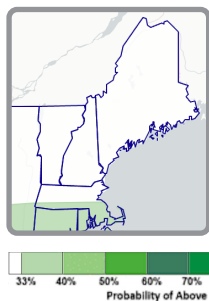
CPC temperature map (left) and precipitation map (bottom) produced February 15. ECCC temperature map (right) produced February 28.

For **March–May**, [NOAA's Climate Prediction Center \(CPC\)](#) and [Environment and Climate Change Canada \(ECCC\)](#) favor **above-normal temperatures** for the Gulf of Maine region due in part to long-term climate trends.

CPC favors **above-normal precipitation** for southeastern Massachusetts.

Meanwhile, ECCC favors **below-normal precipitation** for much of Nova Scotia

and part of southern New Brunswick. **Equal chances** of below-, near-, or above-normal precipitation were forecast for the rest of the Gulf of Maine region.



[NOAA's Spring Flood Outlook](#) indicates

minor flooding is possible in southeastern Massachusetts. Higher elevations of New Hampshire and western Maine "may also be vulnerable to minor flooding from steady snowmelt through the spring, particularly if heavy rainfall occurs in the next few weeks." As of March 21, the **ice jam flood risk is above normal** for northern Maine but **has passed** elsewhere in New England. 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 12. The [New Brunswick Flood Hazard Viewer](#) allows users to view flood maps and future changes due to climate change.

ENSO

El Niño conditions were present but weakening in the equatorial Pacific Ocean during February. NOAA's [Climate Prediction Center](#) indicates there is a 83% chance of El Niño transitioning to ENSO-neutral conditions by spring, with a 62% chance of La Niña developing by summer.

Spring Flooding



Flood Category
■ Minor

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- [Gulf of Maine Council on the Marine Environment, Climate Network](#)
- [University of Maine, School of Marine Sciences](#)
- [State Climatologists](#)
- [National Integrated Drought Information System](#)
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- [National Oceanic and Atmospheric Administration](#)
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