Quarterly Climate Impacts and Outlook

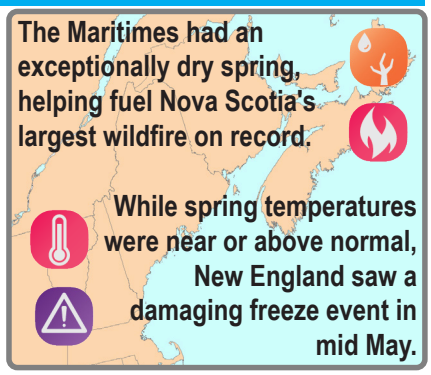
Gulf of Maine Region

June 2023

Gulf of Maine Significant Events – *March–May 2023*

March

March **temperatures** were **near or above normal** for most areas, with Charlo, N.B., having its eighth warmest March. March **precipitation** was generally **below or near normal**, with **more snow than rain** in the Maritimes and parts of New England. A nor'easter brought gusty winds and localized heavy snow to the region from **March 13 to 16**.



April

April was **warmer than normal** for the region, with a few Maritimes sites such as Halifax and Yarmouth, N.S., and Charlo, N.B., having one of their 10 warmest Aprils. On April 14, Concord, NH, reached 32°C (90°F), its **second earliest date** with a high of 32°C (90°F) and tying as its **10th-warmest April temperature**. **April** was **drier than normal** for most areas. A few Maritimes sites including Moncton, N.B., Sydney, N.S., and Halifax, N.S., saw their **driest April on record**, while several other sites including Caribou, ME, had one of their 10 driest Aprils. **Moderate drought** was **introduced** in southeastern New Brunswick, northern Nova Scotia, and parts of P.E.I., while **abnormal dryness developed** in the Maritimes and eastern Massachusetts. However, New Hampshire and portions of Maine were **wetter**. On April 23, Concord saw its **second-wettest April day** with 63 mm (2.46 in.) of precipitation. From **April 30 to May 1**, a storm system dropped 76 to 178 mm (3 to 7 in.) of rain on southern/western Maine and parts of New Hampshire, resulting in flooding. The same storm set a **record-low sea level pressure for May** in Boston, MA**.** With above-normal temperatures and below-normal precipitation, **monthly snowfall** was also **below normal**.

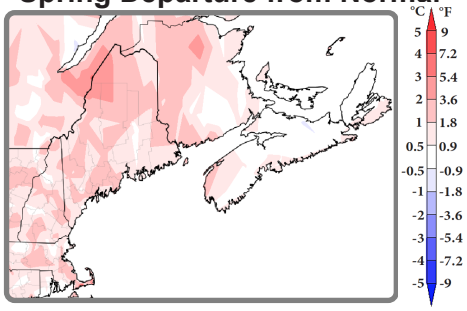
May

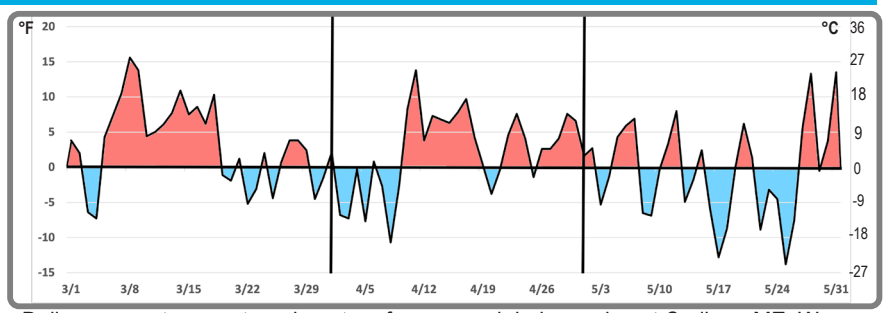
After a mild April, some **crops** were **ahead of schedule**. On **May 18**, temperatures as low as -7°C (19°F) **damaged crops** in New England. Early estimates indicate around a third of Massachusetts' apple crop was damaged and possibly over $1 million in damage to New Hampshire's apple crop. The full extent of damage will take more time to assess. On **May 31**, parts of New Brunswick and Maine were **unusually hot**. Charlo, N.B., had its **warmest May day** with a high of 33.6°C (92°F), while Caribou, ME, tied its seventh warmest at 33.8°C (91°F). **May** was **drier than normal** in northern Maine, where **abnormal dryness developed**, and much of the Maritimes, where **severe drought** was **introduced** and **moderate drought expanded**. Persistent dryness since February in the Maritimes, with Yarmouth, N.S. having its **driest February–May** since 1880, contributed to multiple wildfires. Nova Scotia's **largest fire on record**, estimated to be 17,000 ha (42,000 acres) as of May 31 and continuing to burn in June, caused 5,000 residents to be evacuated and destroyed 50 homes. Smoke from the fire **reduced air quality** as far away as Massachusetts. A wildfire near Halifax, N.S., that charred 788 ha (1,947 acres) **displaced over 16,000 residents** and damaged more than 200 homes/structures. **Smoke from wildfires** burning in western Canada, transported by the jet stream, brought hazy skies to New England multiple times during May. This spring was the **third driest** on record for Yarmouth, N.S., and the **eighth warmest** for Portland, ME. Spring weather resulted in poor maple syrup production in New Brunswick. Since early March, global and North Atlantic **daily sea surface temperatures** have been **record warm**.

Regional Climate Overview – *March–May 2023*

Temperature

Spring Departure from Normal





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

Spring (averaged over March, April, and May) was up to 3°C (5°F) **warmer than normal.*** Portland, ME, had its eighth warmest spring. **March** temperatures were up to 3°C (5°F) **warmer than normal**, with Charlo, N.B., having its eighth warmest March. **April** was up to 3°C (5°F) **warmer than normal**, with a few Maritimes sites such as Halifax and Yarmouth, N.S., and Charlo, N.B., having one of their 10 warmest Aprils. **May** ranged from 2°C (4°F) below normal to near normal for most areas, with eastern Massachusetts and coastal Maine being up to 1°C (2°F) above normal.

*U.S. normals based on 1991–2020 data; Canadian normals based on 1981–2010 data.

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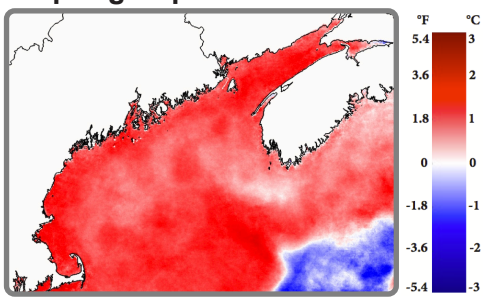
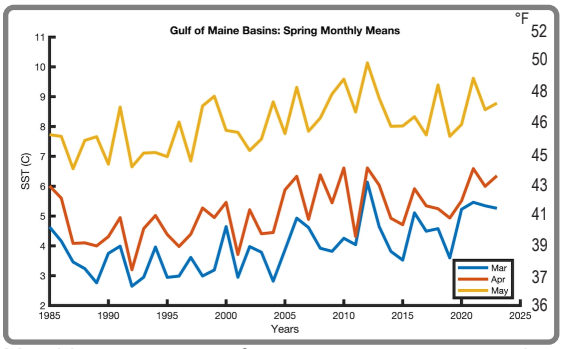
Regional Climate Overview – *March–May 2023*

Sea Surface Temperature

Spring Departure from Normal



Spring sea surface temperature anomalies over the Gulf of Maine were **above normal* in all regions**. Anomalies along Gulf of Maine coastal regions and in the Bay of Fundy were around 1.4°C (2.5°F) but were weaker, around 0.2°C to 0.8°C (0.4°F to 1.4°F), over deeper basins and southwest of Nova Scotia and around 0.5°C (0.9°F) over the Scotian Shelf.



Monthly mean sea surface temperature averaged over the Gulf of Maine for March, April, and May (1985 to 2023). Credit: University of Maine School of Marine Sciences

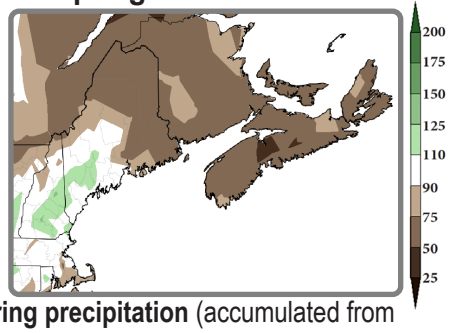
Spring **monthly mean sea surface temperatures**, averaged over the Gulf of Maine deep basins, showed **March** and **April** to be the **fourth** and **fifth warmest** in the record, respectively. **May** was only slightly above average, ranking as the **10th warmest** in the record.

Note: May data is for May 1–25.

*SST normals based on 1991–2020 data.

Precipitation

Spring Percent of Normal



Spring precipitation (accumulated from March to May) ranged from 25% of normal* to 125% of normal. Yarmouth, N.S., had its **third-driest spring** since 1880. **March precipitation** ranged from 25% of normal to near normal for most areas, with parts of New Hampshire and Massachusetts being wetter. **April precipitation** ranged from less than 25% of normal to near normal for most areas, with a few Maritimes sites having their **driest April** on record. However, New Hampshire and parts of Maine were wetter. **May precipitation** ranged from 25% of normal in parts of Nova Scotia and P.E.I. to more than 200% of normal in coastal Maine.

*Precipitation normals based on 1991–2020 data.

Regional Impacts – *March–May 2023*

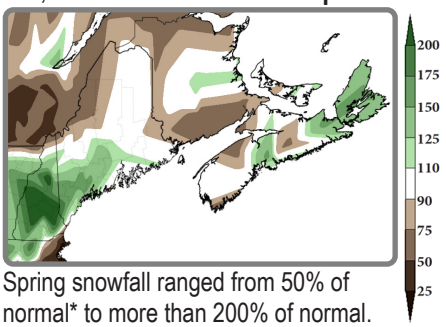
Smoke from Nova Scotia's largest wildfire on record on May 29. Credit: NASA

Spring Conditions

There were **limited storms** during **March**, with the most notable being a **nor'easter** from **March 13 to 16**. Snowfall amounts varied, from little in areas such as eastern Massachusetts and the Atlantic coast of Nova Scotia, which both saw **mostly rain**, to as much as 89 cm (35 in.) in southern New Hampshire. **Heavy snow** and gusty winds in New Hampshire downed trees and power lines, leaving some roads impassable and resulting in power outages. Travel was also impacted, with poor visibility and delayed or cancelled flights. While many areas saw **near- or above-normal snowfall** during **March**, **overall precipitation** (including rain, snow, and ice) was generally **below or near normal** as a large portion of March precipitation fell as snow instead of rain. **End-of-March snow depth** was **below normal** in mainland Nova Scotia but generally **near or above normal** for the rest of the Maritimes.

During the **spring freshet** in **mid April**, flood levels were reached at five sites along the Saint John River in New Brunswick, resulting in some road closures and flooding of parking lots. Levels in Fredericton reached 7.466 m (24.79 ft.), the **tenth-highest flood** since records began in 1968. April featured very few storms, with the most notable event in New England occurring from **April 30 to May 1** when parts of Maine and New Hampshire saw 76 to 178 mm (3 to 7 in.) of rain. Waterways quickly overflowed their banks, with floodwaters entering buildings, swamping vehicles, and sweeping away chunks of roads. During the storm, Boston, MA, saw its **lowest sea level pressure on record for May.** Much of the region saw **below- or near-normal precipitation** during **April**, allowing **moderate drought** and/or **abnormal dryness** to develop in the Maritimes and eastern Massachusetts and leading to more grass fires than usual in New Brunswick. **April snowfall** was **below normal** for the region, while **end-of-month snow depth** in the Maritimes was also **below normal**.

Persistently dry conditions from **February to May** in the Maritimes led to **multiple wildfires**, including **Nova Scotia's largest on record**, which charred thousands of hectares, spreading smoke as far away as Massachusetts. **Drought conditions intensified** in the Maritimes, while abnormal dryness developed in parts of Maine. Boston, MA, had its fourth-least snowy season (October through May) on record.



Spring snowfall ranged from 50% of normal* to more than 200% of normal.
*Normals based on 1991–2020 data.

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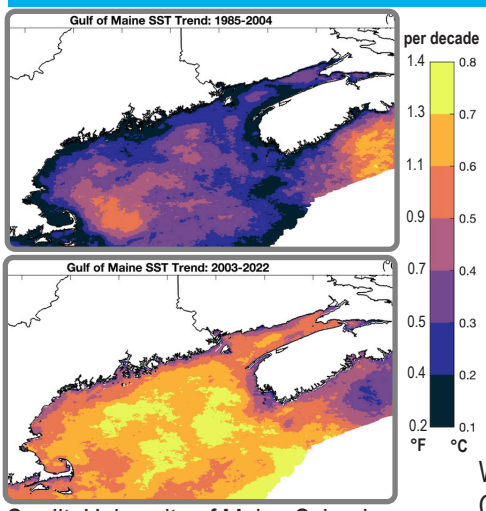
Regional Impacts – *March–May 2023*



Credit: University of Maine School of Marine Sciences

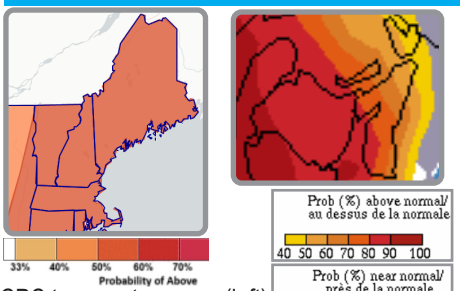
Sea Surface Temperature Trends

The maps to the left show **sea surface temperature trends** over the past 38 years (1985–2022), contrasting warming rates over the first 20 years (1985–2004, top map) with the last 20 years (2003–2022, bottom map). While all regions warmed in both periods, **warming** has been **significantly stronger in recent years** almost everywhere. Over most of the Gulf of Maine, warming rates increased from 0.2 to 0.5°C (0.4 to 0.9°F) per decade to 0.5 to 0.7°C (0.9 to 1.3°F) per decade. Warming over shallow near-coastal regions that was negligible in the 1985–2002 period increased to 0.3 to 0.4°C (0.5 to 0.7°F) per decade in the 2003–2022 period. Values are calculated at each location from monthly means (January–December in 1985–2004 and 2003–2022, respectively). Land and areas seaward of the shelf break are masked white in the maps. A **similar warming trend** has been found in the Northumberland Strait in the Gulf of St. Lawrence.

Hurricane Fiona Impacts Continue

With the 2023 Atlantic hurricane season starting, impacts are still being felt in Eastern Canada from last season's Post-Tropical Cyclone Fiona, likely the **strongest and most destructive tropical system** to have ever affected Canada. Nurseries have seen increased demand this spring as residents look to **replace trees** felled by Fiona. The **changed landscape**, with missing trees and more brush piles, could affect migratory birds. Some auto body shops are **booked through summer**, working on Fiona-related repair claims. As summer approaches, some beach access points in P.E.I. National Park **remain closed**.

Regional Outlook – *Summer 2023*



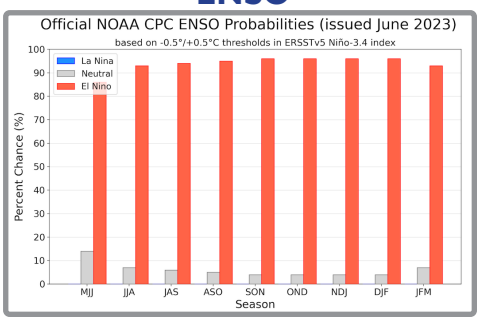
CPC temperature map (left) produced May 18. ECCC temperature map (right) produced May 31.

Temperature and Precipitation

For **June–August**, NOAA's Climate Prediction Center (CPC) and Environment and Climate Change Canada (ECCC) favor **above-normal temperatures** for the entire Gulf of Maine region. **Equal chances** of below-, near-, or above-normal precipitation were forecast for most of the region for **June–August**. However, ECCC favors **below-normal precipitation** for the Atlantic coast of Nova Scotia.

The U.S. National Interagency Fire Center outlooks indicate an **increased potential for significant wildland fires** in parts of Maine and New Hampshire in July and August.

ENSO



El Niño conditions emerged in the equatorial Pacific Ocean during May. NOAA's Climate Prediction Center indicates **El Niño** will likely **continue and strengthen** into winter 2023–24. There is an 84% chance it will peak as a moderate El Niño and a 56% chance it will be strong. El Niño can affect weather patterns, particularly in winter when **storms** often move up the U.S. East Coast, generally leading to **above-normal precipitation** and possibly snowfall.

Atlantic Hurricane Season

NOAA's 2023 Atlantic hurricane season outlook slightly favors a **near-normal season**, with "a likely range of 12–17 named storms, of which 5–9 could become hurricanes, including 1–4 major hurricanes." This is due to **competing factors**. **El Niño**, which typically suppresses Atlantic hurricane activity, is expected to develop this summer. However, conditions such as **above-normal sea surface temperatures** and an active West African monsoon are favorable for hurricane development. The season runs from June 1–November 30, peaking from mid-August to late October. NOAA Eastern Region Climate Services webinar in August 2023 will focus on the updated hurricane outlook.

	2023 Atlantic Season Outlook	1991-2020 Average Season
Number of Named Storms	12-17	14
Number of Hurricanes	5-9	7
Number of Major Hurricanes	1-4	3

Contacts

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