



Gulf of Maine Significant Events – June–August 2023

June

June was quite wet, with the month being **record wet** for Kejimikujik National Park and Kentville, N.S., and among the 10-wettest Junes for a few other Maritimes sites. June also featured **more days than usual with precipitation** of at least 0.2 mm (0.01 in.) at many sites. For instance, Saint John, N.B., reported precipitation on 21 days this June compared to its average of 12.9 days (1981–2010 data). Similarly, Caribou, ME, saw 19 days with measurable precipitation, tying as **second greatest for June**, compared to its average of 14 days (1991–2020 data). One of the **notable rainfall events** occurred roughly the first week of June when a nearly stationary weather pattern brought multiple rounds of precipitation to the region. Most areas saw up to 100 mm (4 in.) of rain, with localized amounts of up to 200 mm (8 in.) in Nova Scotia. The rain **helped ease dryness and reduce wildfire activity**, particularly in the Maritimes. During this time, average daily temperatures were as much as 10°C (18°F) below normal, with highs only reaching 5 to 9°C (41 to 48°F) in the Maritimes. Portland, ME, saw its **coldest June 3 to 4** since records began in 1940, while Caribou, ME, had its **longest streak of June days** with a high less than 16°C (60°F) with seven such days from **June 3 to 9**. Additionally, **wildfire smoke reduced air quality** and led to hazy skies in the region on several occasions during June.

Excessively wet conditions during summer erased drought but also produced deadly and destructive flash flooding.

July became the all-time hottest month on record for parts of Maine and the Maritimes.

July

July was **exceptionally warm**, ranking as the **all-time warmest month** on record for [Caribou, ME](#), multiple sites in the Maritimes including Saint John, [N.B.](#), Halifax, [N.S.](#), and Charlottetown, [P.E.I.](#), and [likely the world](#). Much of the warmth in the region was driven by **unusually mild low temperatures**, enhanced by high dewpoint temperatures and **record warm sea surface temperatures**. For instance, a few sites had their **longest streak of days** with a low at or above 15.6°C (60°F), including Portland, ME, with 32 days (June 28 to July 29). July was also **wetter than normal** for many areas, with heavy rain leading to several instances of **flash flooding** including a **historic event in Nova Scotia** that resulted in four deaths. It was the **wettest July** on record for Saint John, N.B., and Truro, N.S., and the second-wettest July for Boston, MA. In **mid-July**, Canadian **wildfire smoke** led to **reduced air quality** in New England.

August

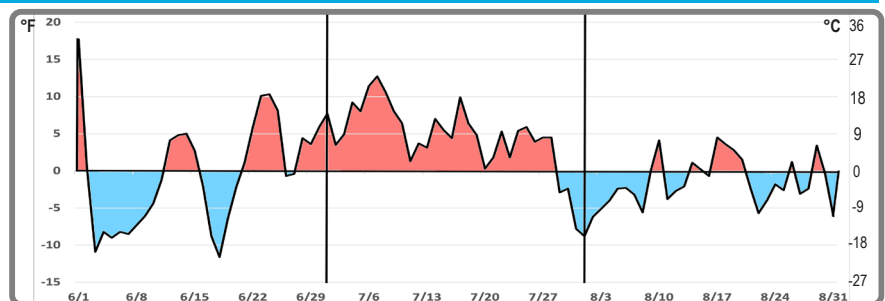
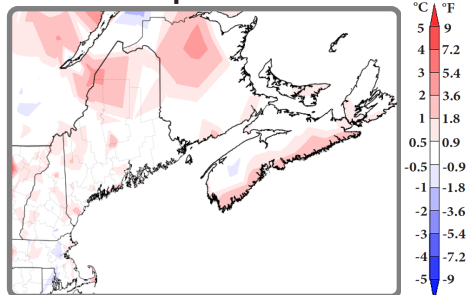
August was another **wet month**, ranking as the **wettest August** on record for several Maritimes sites including Bathurst, N.B., and Western Head, N.S., and as the sixth wettest for Caribou, ME. **Localized flash flooding** and **severe storms** accompanied the rainfall.

Caribou, ME, and a few Maritimes sites including Fredericton, N.B., and Halifax, N.S., had their **warmest average low temperature for summer**, with a few other sites having one of their five warmest. Caribou also had its 10th-warmest summer. With wetter-than-normal conditions each month, it was the **wettest summer on record** for a few sites including Fredericton, N.B., Yarmouth, N.S., and Charlottetown, P.E.I., and among the 10 wettest for other sites such as Boston, MA, and Portland, ME. The **wet summer conditions** led to [more mosquitoes](#) and **losses of crops** such as [vegetables](#) and [grains](#) in the Maritimes and [potatoes and corn](#) in New England.

Regional Climate Overview – June–August 2023

Temperature

Summer Departure from Normal



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

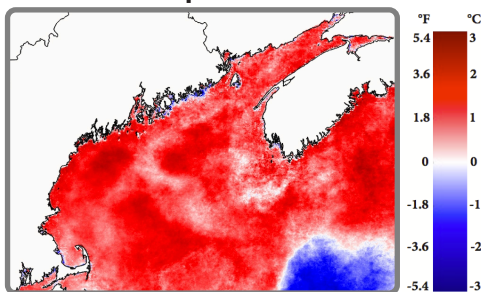
Summer (averaged over June, July, and August) was up to 2°C (4°F) **warmer than normal**.* Caribou, ME, had its 10th warmest summer. **June** temperatures ranged from 2°C (4°F) **below normal to near normal**. **July** was up to 3°C (5°F) **warmer than normal**. July ranked as the **all-time warmest month** on record for Caribou, ME, and multiple sites in the Maritimes. **August** ranged from 2°C (4°F) below normal to near normal for most areas.

*Normals based on 1991–2020 data.

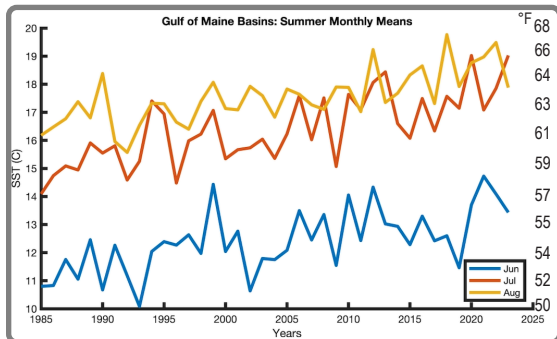
Regional Climate Overview – June–August 2023

Sea Surface Temperature

Summer Departure from Normal



Summer sea surface temperature anomalies over the Gulf of Maine were **above normal*** in almost all regions. Anomalies over deeper basins in the Gulf of Maine and the Scotian Shelf were greater than 2.0°C (4°F) but were weaker, from 0.5°C to 1.5°C (0.9°F to 2.7°F), along the [Eastern Maine Coastal Current region](#) and in parts of the Bay of



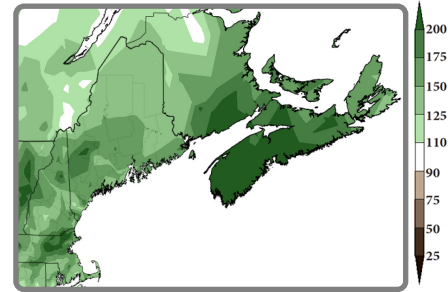
Monthly mean sea surface temperature averaged over the Gulf of Maine for June, July, and August (1985 to 2023). Credit: University of Maine School of Marine Sciences

*SST normals based on 1991–2020 data.

Fundy. Patches of near-normal temperatures surrounded many of the regional shallow banks. Summer **monthly mean sea surface temperatures**, averaged over the Gulf of Maine deep basins, showed June was the eighth warmest, **July was record warm**, and August was closer to average, the 14th warmest of the 39-year record. The global average sea surface temperature for July was the **highest for any month** in [NOAA's 174-year record](#), driven by [El Niño superimposed on global climate trends](#).

Precipitation

Summer Percent of Normal

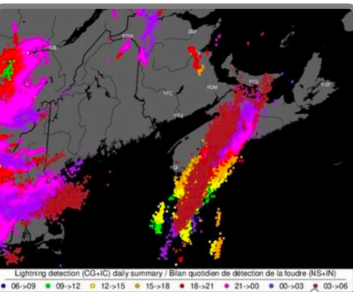


Precipitation for the summer season (accumulated from June to August) ranged from near normal* to more than 200% of normal. It was the **wettest summer** on record for several Maritimes sites and among the 10 wettest for a few other sites in the region. **Precipitation during each individual summer month** generally ranged from near normal to more than 200% of normal. **June** was **record wet** for Kejimikujik National Park and Kentville, N.S., and among the 10 wettest for some other Maritimes sites. **July** was **record wet** for Saint John, N.B., and Truro, N.S., and the second wettest for Boston, MA. **August** was **record wet** for several Maritimes sites and the sixth wettest for Caribou, ME. *Precipitation normals based on 1991–2020 data.

Regional Impacts – June–August 2023

Summer Conditions

There were multiple rounds of rain during June, helping [ease drought and abnormal dryness](#) in the region and reduce wildfire activity in the Maritimes. **Nova Scotia's largest wildfire**, which [burned 23,525 ha \(91 sq. mi.\)](#) and [destroyed 150 structures](#), was **under control** on **June 13** after burning for over two weeks. The [province's burn ban](#) was also lifted the same day. However, some of the rain also led to **localized flash flooding**. For instance, on **June 26**, as much as 152 mm (6 in.) of rain [clogged roads with debris](#) and [washed out bridges](#) and roads in parts of New Hampshire and Maine. Similarly, on **June 29**, downpours in northwestern New Brunswick, with a report of 55 mm (2 in.) in about 45 minutes, caused road closures due to washouts and flooding and damage to [more than 250 homes](#). The wet conditions caused issues for strawberry and grape growers in [Nova Scotia](#) and [P.E.I.](#)



Lightning strokes in 3-hour periods from 06 UTC (2 AM EDT/3 AM ADT) on July 21 to 06 UTC on July 22. Credit: Environment and Climate Change Canada

There were several **heavy rainfall events** during **July** that, combined with wet antecedent conditions, led to flash flooding. For instance, from **July 15 to 16**, as much as 165 mm (6.50 in.) of rain fell in New Hampshire, with floodwaters damaging [more than 125 roads](#) and potentially [contaminating wells and swimming areas](#). From **July 21 to 22**, Nova Scotia and eastern P.E.I. saw up to 150 mm (6 in.) of rain, with localized reports of near 260 mm (10 in.). Some sites reported up to 100 mm (4 in.) in an hour, exceeding the threshold for a **100-year storm event**. Parts of southern and central of Nova Scotia experienced **historical flooding**, with a [province-wide state of emergency](#) in effect and **evacuation orders** for [hundreds of residents](#). Numerous roads [were impassable](#) including several major highways, and multiple bridges were washed out. [Four people died](#) when their vehicles became caught in flood waters. A rail line washout halted train service between Halifax and the rest of Canada. More than 70,000 Nova Scotia customers lost power. This event caused Nova Scotia to set a new record for **greatest number of cloud-to-ground lightning strokes for July** and was comparable to Hurricane Beth in August 1971 for rainfall, flooding, and severe impacts. **Flooding and overly wet conditions** during July led to **crop losses** in [New Hampshire](#) and [Massachusetts](#) and [created challenges](#) for dairy farmers in New Brunswick. [More than 70 beaches](#) in Massachusetts and [several in Nova Scotia](#) and New Hampshire were closed at times during July due to **unsafe water quality** caused by high levels of bacteria, likely from heavy rain runoff causing wastewater systems to overflow. The wet July [erased all drought and abnormal dryness](#) in the region.

Regional Impacts – June–August 2023

Summer Conditions Continued

There were more **heavy rain** and **flash flood** events in August. From **August 4 to 5**, central Nova Scotia, which experienced historic flooding in July, saw [street flooding](#) and [washed out roads](#) when as much as 144 mm (6 in.) of rain fell, with reports of up to 56 mm (2 in.) in an hour. On **August 8**, up to 130 mm (5 in.) of rain flooded roads and buildings and [stranded cars](#) in Maine and Massachusetts, where damage in one town [approached \\$30 million](#). In **late August**, a low pressure system with **tropical moisture** from Hurricanes Franklin and Idalia produced up to 70 mm (3 in.) of rain in the region, with local amounts of up to 120 mm (5 in.) in Nova Scotia. Caribou, ME, had its 10th-wettest August day with 49 mm (1.91 in.) on the August 30. The storms also created [large waves and rip currents](#) along the New England coast. New England also experienced several **severe weather events** during August. **Five tornadoes snapped and uprooted trees** in Massachusetts, which averages no tornadoes in August (1997–2022 data) and only two annually (1993–2022 data). In Maine, seven people were [struck or shocked by lightning](#), straight-line winds downed trees, and **lime-sized hail** of 5 cm (2 in.) was reported.

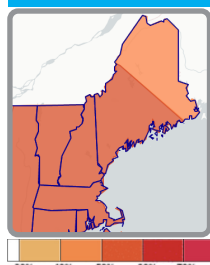
Air Quality

Several times during **June**, **smoke from wildfires** burning in Quebec **reduced air quality** and caused [hazy skies](#) in the region. Air quality was unhealthy for sensitive groups in [Massachusetts](#) and southern New Hampshire in **early June**, while [northern Maine](#), P.E.I., and New Brunswick experienced poor air quality and [reduced visibilities](#) in **late June**. The U.S. National Weather Service office in Gray, ME, issued [11 Air Quality Alerts in June](#), its **greatest number for June** and second greatest for any month since records began in June 2007. From **July 17 to 18**, New Hampshire and Maine experienced [reduced air quality](#) and hazy skies when a plume of smoke from wildfires burning in western Canada moved across the region. In the U.S., there was an **increase in asthma-related emergency room visits associated with days with wildfire smoke**. 2023 was the **worst year on record for wildfires in Canada**, with [more than 15 million hectares](#) burned.

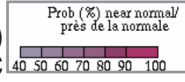
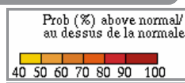
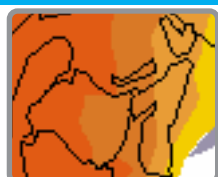


Smoke over Massachusetts and New Hampshire on June 6. Credit: NOAA

Regional Outlook – Autumn 2023



CPC temperature map (left) produced August 17. ECCC temperature map (right) produced August 31.



Temperature and Precipitation

For **September–November**, [NOAA's Climate Prediction Center \(CPC\)](#) and [Environment and Climate Change Canada \(ECCC\)](#) favor **above-normal temperatures** for the region, due in part to long-term climate trends. ECCC favors **below-normal precipitation** for autumn in eastern P.E.I. and much of Nova Scotia. **Equal chances** of below-, near-, or above-normal precipitation were forecast for the rest of the Gulf of Maine region.

Atlantic Hurricane Season

NOAA's [updated 2023 Atlantic hurricane season outlook](#) favors an **above-normal season**. Factors such as **record-warm Atlantic sea surface temperatures** are expected to counterbalance El Niño, which tends to limit storm development. There were four tropical cyclones by June 30, three more than average. It was the **first time since 1968** that the Atlantic had two named storms in June simultaneously.

The season's first hurricane, Don, was July's only storm, **formed nearly a month earlier than average**, and was the third longest-lived named storm in July. In **August**, there were **six named storms** (average is 3-4), with two becoming major hurricanes (average is 1-2). There were 11 named storms as of **August 31**, which is around a month earlier than average. The season runs from June 1–November 30, peaking from mid-August to late October. NOAA Eastern Region Climate Services webinar in [August 2023](#) focused on the updated hurricane outlook.

	2023 Updated Outlook	1991-2020 Average Season
Named Storms	14-21	14
Hurricanes	6-11	7
Major Hurricanes	2-5	3

Contacts

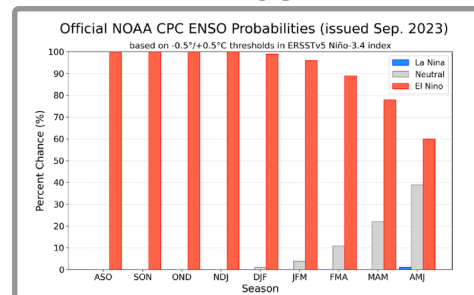
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ENSO



El Niño conditions strengthened in the equatorial Pacific Ocean during August. NOAA's [Climate Prediction Center indicates El Niño will continue](#) through winter, likely peaking as a [strong event](#). 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. New England is also expected to see [more high-tide flooding days](#) this year due in part to increased storminess related to El Niño.

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