



Gulf of Maine Significant Events – June–August 2022

Drought conditions expanded and intensified in New England during summer. Several rounds of **severe weather** affected the region. See Regional Impacts for details.

June

From **June 19 to 21**, daily temperatures were as much as 9°C (16°F) below normal, making the first day of **summer feel more like spring**. A high of 9.4°C (49°F) in Caribou, ME, on June 19 was the site's **latest date** it failed to reach 10°C (50°F). An **unusually late frost advisory** was issued for northern Maine. Western New Brunswick saw mild frost, with Edmundston's record low of -0.1°C (32°F) being the site's **third latest below-freezing temperature**. On **June 25 and 26**, highs reached 33°C (91°F), with Fredericton, N.B., seeing its **first heat event** of the season and some sites seeing their only June day to reach 30°C (86°F). Warm water temperatures contributed to **blue-green algae growth** in [some Nova Scotia lakes](#). Dryness worsened in New England but slow-moving storms soaked parts of the Maritimes. Sydney, N.S., had its third wettest June since 1870.

July

July ranked among the **five all-time hottest months** at Boston, MA, and Portland, ME, and among the **10 hottest Julys** for Halifax and Yarmouth, N.S. **July 19 to 25** was particularly hot, setting [multiple daily records](#). Boston had seven consecutive days with a high of at least 32°C (90°F), tying its sixth longest streak, and eight straight days with a low of at least 21°C (70°F), tying its **fifth longest streak**. Boston reached 38°C (100°F) on **July 24**, its **10th hottest July day**. Ingonish, N.S., recorded 35.4°C (96°F) on **July 25**, its **second hottest July day** and fifth all-time hottest day. The heat affected some [business operations](#). Precipitation varied, with Boston having its **fourth driest July** but Woodstock, N.B., having its **third wettest July**.

August

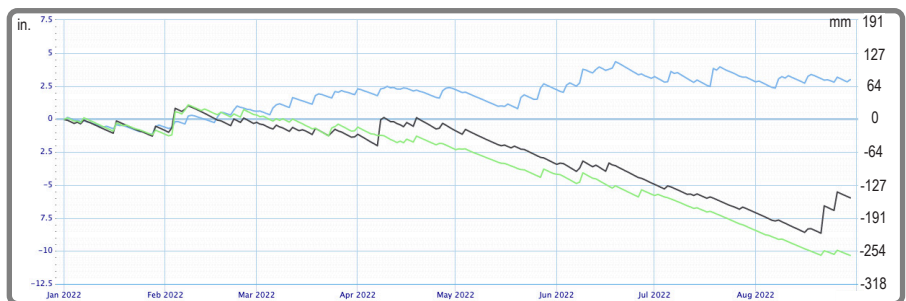
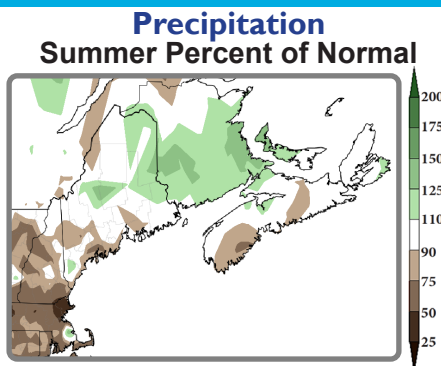
August was **record hot** for Concord, NH, and Halifax, N.S. and among the 10 hottest Augusts/all-time months for several sites. The number of **unusually hot days and/or nights** were among the [10 greatest for August](#)/any month at a few New England sites. For instance, Boston, MA, (11 days) and Concord (14 days) had their **greatest number of August days** with a high of at least 32°C (90°F), while Portland tied its **longest streak** with a low at or above 21°C (70°F) at three days. **August 4 to 8** was [particularly hot](#), with Portland having its **warmest August**/fifth all-time warmest low temperature (23°C [74°F]). Also, Concord (high of 37°C [98°F]) and Boston (low of 26°C [78°F]) had one of their 10 warmest highs or lows for August. On **August 6 and 7**, daily sea surface temperatures in [part of the Gulf of Maine](#) tied the **all-time hottest record** of 19.7°C (67.5°F). Warm water temperatures led to [algal blooms in Maine](#) and [a fishkill/algal blooms](#) in P.E.I. **August precipitation varied**, with **drought** in New England and Moncton, N.B., having its **sixth wettest August**.

Summer was record hot for Yarmouth, N.S., and among the **10 hottest** for multiple sites including Boston, MA, and Halifax, N.S., with the number of **unusually hot days and/or nights** among the 10 greatest for summer. Boston had its **fourth driest summer**.

Summer was warmer than normal, with a few notable heat events.

New England was very dry, with drought intensifying; however, parts of the Maritimes were wetter than normal.

Regional Climate Overview – June–August 2022



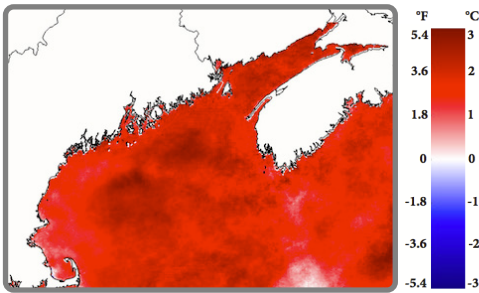
Accumulated daily precipitation departures from normal for January 1 to August 31 at Caribou, ME (blue line); Portland, ME (black line); and Boston, MA (green line).

Summer precipitation (accumulated from June to August) ranged from 25% of normal to 150% of normal. Boston, MA, had its fourth driest summer, while Woodstock, N.B., had its sixth wettest. **June precipitation** ranged from 50% of normal in New England to 175% of normal in the Maritimes. Sydney, N.S. had its third wettest June. **July precipitation** ranged from less than 25% of normal in Massachusetts to over 150% of normal in parts of New Brunswick and P.E.I. July was the fourth driest in Boston but the third wettest in Woodstock, N.B. **August precipitation** ranged from 25% of normal in Massachusetts and New Hampshire to over 150% of normal in Maine and parts of New Brunswick. Moncton, N.B., had its sixth wettest August. *Precipitation normals based on 1991–2020 data.

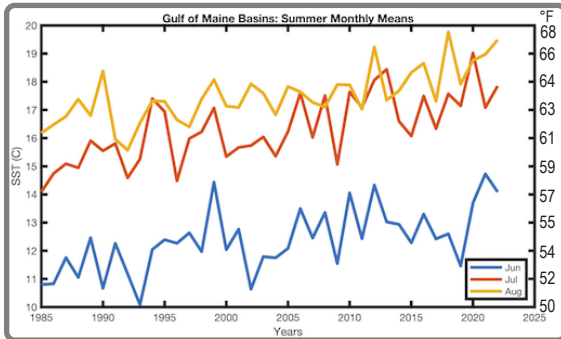
Regional Climate Overview – June–August 2022

Sea Surface Temperature

Summer Departure from Normal



Summer sea surface temperature anomalies over the Gulf of Maine were **above normal** in all regions. Anomalies were around 1.5°C (3°F) along the coast, were greater than 2.5°C (5°F) over deeper basins and in the Bay of Fundy, and were greater than 2.0°C (4°F) over the Scotian Shelf.



Monthly mean sea surface temperature, averaged over the Gulf of Maine deep basins, for June, July, and August (1985 to 2022). Credit: University of Maine School of Marine Sciences

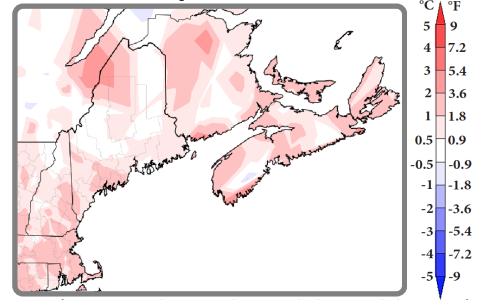
*SST normals based on 1985–2014 data

Summer monthly mean sea surface temperatures, averaged over the Gulf of Maine deep basins, showed both June and July to be the **fourth warmest** on record, surpassed only in 1999, 2012, and 2021 for June and in 2012, 2013, and 2020 for July. August 2022 was the **second warmest** on record, surpassed only in 2018.

Warm ocean temperatures contributed to [multiple algal blooms](#) in East Casco Bay, ME, that **killed a large number of soft-shell clams**.

Temperature

Summer Departure from Normal



Summer (averaged over June, July, and August) was up to 2°C (4°F) **warmer than normal**. It was **record hot** for Yarmouth, N.S., and among the 10 hottest at multiple sites including Boston, MA. **June** temperatures were within 1°C (2°F) of normal. **July** was up to 3°C (5°F) **warmer than normal**, ranking among the **five all-time hottest months** at Boston and Portland and among the 10 hottest Julys for Halifax and Yarmouth, N.S. **August** was up to 3°C (5°F) **warmer than normal**. It was a **record hot August** for Concord and Halifax, N.S., among the 10 hottest Augusts for multiple sites, and among the 10 all-time hottest months for Concord and Portland.

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

Regional Impacts – June–August 2022

Summer Storms

June was a **relatively quiet month**, except in eastern Nova Scotia and Cape Breton which saw **multiple soaking rainstorms**. Severe thunderstorms on **June 17 and 18** produced **hail** ranging from pea sized up to 3.2 cm (1.25 in.), **heavy downpours** with as much as 23 mm (1 in.) of rain in 30 minutes in northern Nova Scotia, and gusty winds that downed tree branches. With few storms, **lightning stroke counts** across all three provinces were **below average**.

Several rounds of severe storms moved through the region during **July**. Lightning activity was below or near normal in the Maritimes.

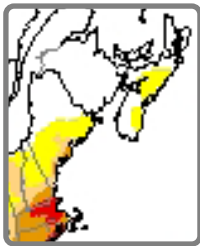
- **July 12: Straight-line winds** of at least 97 km/h (60 mph) in Aroostook County, ME, **snapped dozens of trees**, flipped docks and boats, ripped shingles off roofs, and destroyed outbuildings. [Damaging wind gusts](#) and small hail were also reported in New England.
- **July 18 to 19: An EF-1 tornado** with winds of up to 145 km/h (90 mph) [damaged 200 trees](#) and destroyed a few outbuildings in Cheshire County, NH. Wind gusts in excess of 100 km/h (62 mph) in New Brunswick caused over 4,000 customers to lose power.
- **July 21: Straight-line winds** of up to 129 km/h (80 mph) in [Cumberland County, ME](#), and [Carroll County, NH](#), downed **more than 500 trees**, killing a person and damaging at least 30 structures/vehicles. Storm reports also noted [downed power lines](#) and ping pong to [golf ball-sized hail](#).
- **July 24 to 25: A severe thunderstorm** in Aroostook County, ME, produced **straight-line winds** of up to 161 km/h (100 mph), downing trees and power lines, and dropped **hail as large as tennis balls** (6.4 cm [2.5 in.]), the [largest hail to fall](#) in the state since August 2015. Storms downed trees and branches in northern New Brunswick and left over 3000 customers without power in Nova Scotia.

August featured a **limited number of storms**; however, there were a few localized heavy rainfall and severe weather events. For instance, a [culvert failure](#) and partial road collapse due to flooding in western Maine on **August 9** resulted in a 230 km (143 mi.) long detour for vehicles that rely on state roads. Flooding from up to 119 mm (5 in.) of rain in eastern Nova Scotia from **August 17 to 18** [washed out a portion](#) of the Cabot Trail. Severe storms brought up to 51 mm (2 in.) of rain to parts of southern Maine and dropped hen egg-sized hail that damaged crops and dented cars in New Hampshire on **August 26**. **Timely widespread rainfall** in **early August** gave [potato crops a boost](#) in P.E.I. and northern Maine. Overall, lightning activity was below normal in the Maritimes, with P.E.I. observing its **lowest August and year-to-date** activity since records began in 2002.



Tornado damage in New Hampshire in mid-July. Credit: NWS Gray, ME

Regional Impacts – June–August 2022



Intensity:
 D0 Abnormally Dry
 D1 Drought - Moderate
 D2 Drought - Severe
 D3 Drought - Extreme
 D4 Drought - Exceptional

Drought Impact Types:
 S = Short-Term, typically <6 months (e.g. agriculture, grasslands)
 L = Long-Term, typically >6 months (e.g. hydrology, ecology)

North American Drought Monitor from August 31, 2022.

Drought Conditions

During **summer**, **drought** and **abnormal dryness** expanded and intensified in New England due to increasing precipitation deficits, below-normal streamflow and groundwater levels, and little soil moisture.

Water Resources: Record or near-record low flows were observed on [multiple waterways](#) in New England, [stressing fish](#), affecting recreational activities, and contributing to [increased algae growth](#). Dozens of **wells ran dry** in New England, with low water levels in wells potentially [increasing the concentration](#) of undesirable minerals. Stonington, ME, [purchased and trucked in](#) 64,000 gallons of water at a cost of around \$7,000. **Water restrictions** were in effect for more than 200 New England water suppliers/communities.

Agriculture: New England farmers [relied heavily on irrigation](#); however, some irrigation ponds [ran low](#) or had **water quality issues**, forcing growers to [haul in water](#). This resulted in **increased labor and costs** of operation, with one grower estimating up to \$100,000 in additional irrigation-related expenses. **Crop losses**, including [Christmas tree saplings](#) and [wild blueberries](#), and **stunted and stressed crops** were reported. Hay quality and **yields were reduced**, with some farmers getting **only one hay cutting** instead of three and some [using supplemental feed](#), further increasing costs. Dry conditions in Maine [stressed some bee hives](#), with reduced honey yields expected. **Drought-stressed trees** could lead to [more power outages](#) and could affect the [timing and intensity](#) of fall foliage.

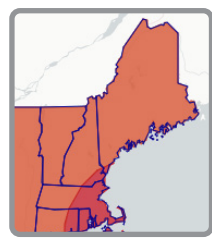
Fire: Dry grass and shrubs [increased fuels](#) available to fires, with an **enhanced fire risk** and an **uptick in fires** in New England. For instance, Massachusetts saw over 100 wildfires in August while Maine saw more than 50 wildfires. Fires also [burned deeper](#) and were **more difficult to extinguish**.



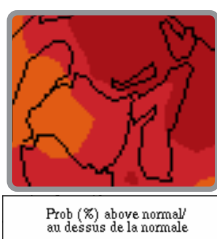
East Branch Neponset River in Canton, MA, in early August. Credit: Ron Horwood, NOAA/NWS/NERFC

Regional Outlook – Autumn 2022

Temperature and Precipitation



CPC temperature map (above) produced August 18.



ECCC temperature map (above) produced August 31.

For **September–November**, [NOAA's Climate Prediction Center \(CPC\)](#) favors **above-normal temperatures** for New England, driven in part by long-term climate trends. [Environment and Climate Change Canada \(ECCC\)](#) also favors **above-normal temperatures** for the Maritimes. ECCC favors **below-normal precipitation** for Nova Scotia, much of P.E.I., and southern New Brunswick for **September–November**, with **equal chances** of below-, near-, or above-normal precipitation forecast for the rest of the Maritimes and all of New England.

	2022 Updated Atlantic Season Outlook	1991-2020 Average Season
Number of Named Storms	14-20	14
Number of Hurricanes	6-10	7
Number of Major Hurricanes	3-5	3

Contacts

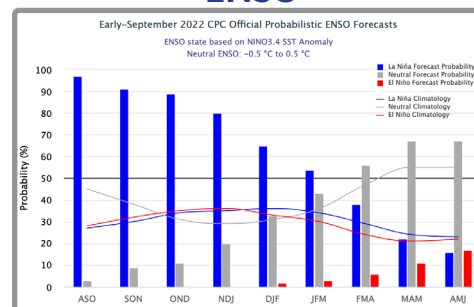
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ENSO



During August, **La Niña conditions continued** in the equatorial Pacific Ocean. NOAA's [Climate Prediction Center indicates](#) there is a 91% chance La Niña will continue through September–November and a 54% chance of La Niña in January–March 2023. [NOAA states](#) this would be "only the third time with three La Niña winters in a row in our 73-year record" and "[the first not to follow](#) a strong El Niño."

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