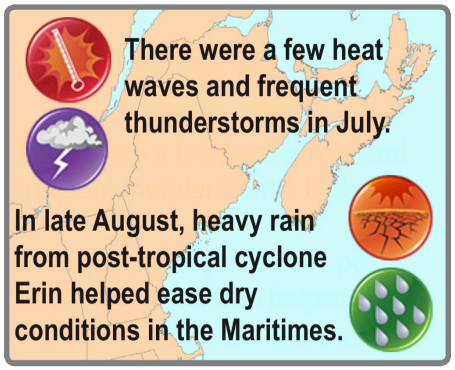
Quarterly Climate Impacts and Outlook

Gulf of Maine Region

September 2019

Gulf of Maine Significant Events – *June–August 2019*



June:

From **June 20 to 22**, a **slow-moving storm** brought up to 125 mm (4.90 in.) of rain to the region, with the greatest totals in Nova Scotia. Two homes in Annapolis County, N.S, were evacuated due to land shifting as a result of the **heavy rain**. Minor flooding occurred in P.E.I. Strong winds behind the system caused two ferry crossings to be cancelled.

July:

July 2019 was the **all-time hottest month on record** for Boston, MA, and Portland, ME. This July was among the 10 hottest Julys on record for several other sites across the region. Boston had 17 days in July with a minimum (min) temperature of 21°C (70°F) or higher, 10 more than average and its **greatest number for any month** on record (since 1872). Boston also had its **highest average min temperature for any month**. The number of days in July with a high of at least 32°C (90°F) ranked among the 10 all-time greatest for any month on record at a couple of sites.

The region experienced a few **heat waves** during July, with high temperatures reaching 37°C (99°F). During one heat wave, Boston tied its **all-time highest min temperature** on record, while Portland had its second warmest. **Severe thunderstorms** often accompanied the heat. See Impacts section for details.

There were also **a few instances of flash flooding** during the month. For example, up to 178 mm (7 in.) of rain fell in parts of New England from **July 11 to 12**, flooding streets and basements in southeastern Massachusetts and destroying roads and bridges in central New Hampshire. Cockermouth River in Groton, NH, **rose almost 2.4 m (8 ft.) in just over an hour**.

On **July 23**, **three EF-1 tornadoes** touched down on Cape Cod, MA, uprooting and snapping over 150 trees, damaging buildings, and leaving more than 30,000 customers without power. There have only been three other tornadoes on Cape Cod since 1950.

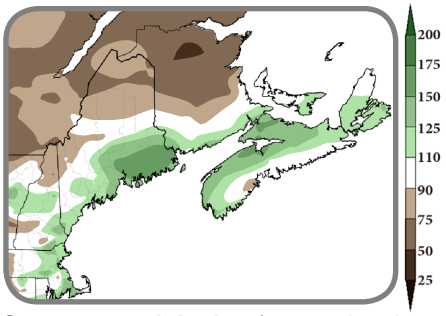
August:

There were many days in August with thunderstorms and heavy rain. Thunderstorms downed trees and produced **ping-pong ball-sized** hail on **August 3 and 4**. Flash flooding from up to 102 mm (4 in.) of rain left **some roads impassable** in parts of New England on **August 7 and 8.** On **August 10**, **ping-pong ball-sized hail** pelted Maine and New Brunswick. In that province, up to 90 mm (3.50 in.) of rain fell in under 3 hours in Shediac and more than 27,000 customers lost power. On **August 12**, an **EF-1 tornado** damaged over 100 trees in Washington County, ME. Severe storms on **August 21** produced **funnel clouds** in New England.

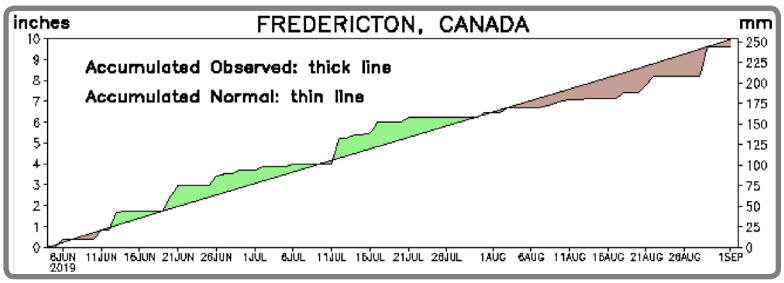
From **August 29 to 30**, a cold front and moisture from **post-tropical cyclone Erin** brought up to 160 mm (6 in.) of rain to the region, with the greatest totals in Nova Scotia. Rainfall rates exceeded 30 mm/h (1 in./hr) in a few locations. Several sites set single-day rainfall records. **Flash flooding** washed out roads and impacted buildings, including 60 single-family dwellings, in Nova Scotia. Around 15,000 customers lost power in that province. Some shellfish harvesting areas were shut down in parts of the Maritimes.

Regional Climate Overview – *June–August 2019*

Precipitation
Summer Percent of Normal



U.S. precipitation normals based on 1981–2010 data; Canadian precipitation normals based on 2002–2018 data.



Accumulated precipitation compared to normal during summer. Green areas indicate a surplus, while brown areas denote a deficit. Credit: NOAA CPC.

Summer precipitation (accumulated from June to August) ranged from 25% of normal to 175% of normal. It was the **fifth driest** summer on record for Caribou, ME. **June precipitation** ranged from 50% of normal in parts of New Brunswick to more than 200% of normal in parts of Nova Scotia. This June ranked among the **five wettest** on record for several Maritimes sites. **July precipitation** ranged from 25% of normal to near normal for most areas. July 2019 was among the **10 driest** on record for a few Maritimes locations. However, eastern Massachusetts, Downeast Maine, and parts of Nova Scotia saw up to 200% of normal. **August precipitation** ranged from 50% of normal in northern New Brunswick and southeastern Massachusetts to more than 200% of normal in Downeast Maine.

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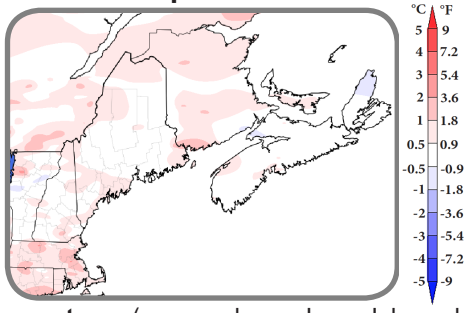
Regional Climate Overview – *June–August 2019*

Temperature

Summer Departure from Normal

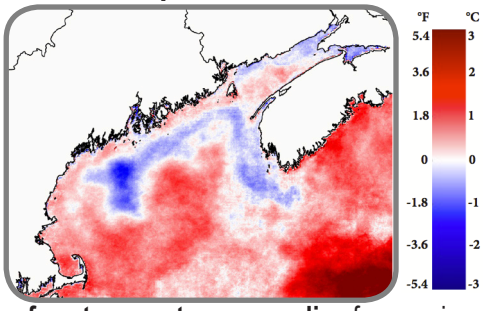


Summer temperatures (averaged over June, July, and August) were up to 2°C (4°F) above normal for most of the region. It was the **fourth warmest** summer on record for Boston, MA. **June was a cool month**, with temperatures as much as 2°C (4°F) below normal for most areas. **July was a hot month** for most areas. Temperatures were up to 3°C (5°F) above normal, with the warmest areas in New England. **August temperatures** were up to 2°C (4°F) warmer than normal.

Temperature normals based on 1981–2010 data.

Sea Surface Temperature

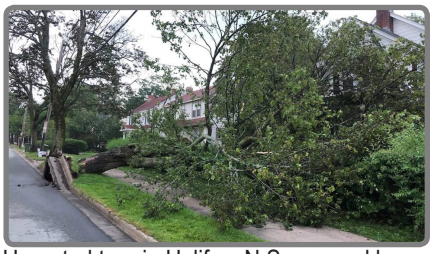
Summer Departure from Normal



Cold sea surface temperature anomalies from spring continued only in specific regions associated with the outer edges of the Maine Coastal Currents, the coastal area southwest of Nova Scotia and along the New Brunswick shore of the Bay of Fundy. Elsewhere, **warm temperature anomalies** dominated, weak [less than 0.5°C (1°F)] along the New England coast but reaching 1°C (2°F) over the central Gulf of Maine and 1.5°C (3°F) along the Atlantic coast of Nova Scotia.

SST normals based on 1985–2014 data

Regional Impacts – *June–August 2019*



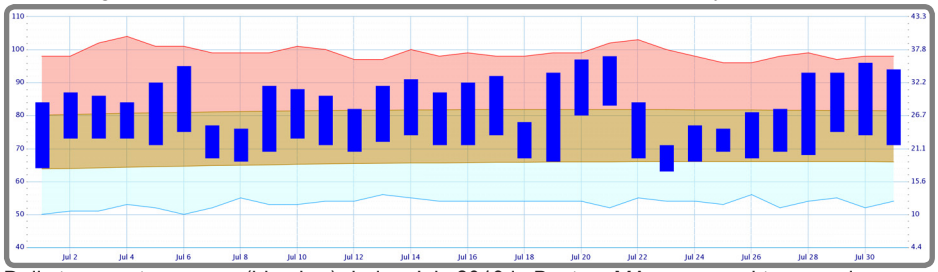
Uprooted tree in Halifax, N.S., caused by a severe thunderstorm on July 21, 2019. Image courtesy of CBC/Craig Paisley.

July Heat and Severe Weather

The region experienced a few heat waves and several days with severe thunderstorms during July. From **July 4 to 6**, maximum (max) temperatures were as high as 35°C (95°F), with the humidity making it feel as hot as 41°C (106°F). Severe thunderstorms occurred with the passage of a cold front on July 6. Trees and wires were downed in Maine and New Hampshire. **Torrential rain** also occurred, with a report of 25 mm (1 in.) of rain in 15 minutes in western Maine.

Another heat wave from **July 19 to 22** had max temperatures of up to 37°C (99°F), but it felt as hot as 44°C (111°F). Humidity levels were unusually high. For instance, at 11 PM on July 20, Boston, MA, had a dewpoint of 25°C (77°F), which ranks among **some of the highest dewpoints** on record for the site. Low temperatures were record setting in some locations. On July 21, Boston tied its **all-time highest minimum temperature** on record (since 1872) with a low of 28°C (83°F), while the low of 24°C (76°F) in Portland, ME, ranked as its **second all-time hottest** on record (since 1874). A cold front brought relief from the heat but also helped spark severe storms in Maine, southern New Brunswick, and Nova Scotia on **July 21**. Strong wind gusts knocked down trees, branches, and wires. NS Power reported more than 44,000 customers lost power, with most outages in the Halifax area. Downpours led to localized flooding in southern New Brunswick and northern Nova Scotia, while **ping pong ball-sized hail** damaged vehicles in central Maine.

From **July 28 to 31**, max temperatures reached 36°C (96°F), setting several high temperature records. With the humidity, it felt as hot as 41°C (106°F). Salmon pools on sections of the Nepisiguit and Miramichi rivers in New Brunswick **were closed for fishing** due to higher-than-normal water temperatures, which are stressful to fish. Severe thunderstorms in Nova Scotia on July 29 produced very heavy rainfall for localized areas. A private road near Antigonish, N.S., washed out in the **downpours**, with a nearby weather station reporting 66.3 mm (2.60 in.) of rain in three hours. On July 31, severe storms knocked down trees and wires and caused power outages in New England. A microburst with **winds of up to 129 km/h (80 mph)** caused a ground stop at Boston's Logan Airport, delaying hundreds of flights, and capsized several sailboats in nearby Winthrop. Golf ball-sized hail was reported in New Hampshire.



Daily temperature range (blue bar) during July 2019 in Boston, MA, compared to normal temperature range (tan area), record max temperature (red line), and record min temperature (blue line). Credit: Northeast Regional Climate Center.

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Regional Impacts – *June–August 2019*

Very dry conditions caused reduced potato crop yields in P.E.I. Image courtesy of Laura Meader/CBC.

Summer Conditions

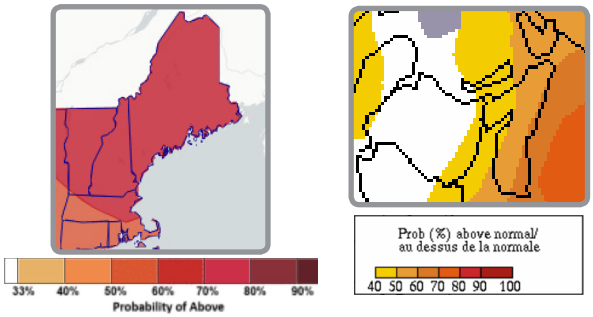
The **cool, wet June** delayed the planting of crops and hampered farming activities in the region. However, the conditions helped apple orchards in P.E.I. and kept cranberry growers in Massachusetts from having to irrigate. **Bursts of heavy rain in early summer** and **warm temperatures** in **July** contributed to harmful algal blooms. Several bodies of water in New England were closed, as were some shellfish farms along the coastline. An **algae advisory** was issued for a portion of the St. John River in New Brunswick, and officials in Nova Scotia advised the public to avoid the water in Lake Ainslie, parts of the Margaree River, Sandy Lake, and Lake Micmac due to harmful algae blooms. The wet conditions also contributed to an abundant mosquito population, increasing the risk of contracting mosquito-borne viruses. **Warmer, drier weather in July and August** stressed crops and delayed harvest in the Maritimes and caused some New England farmers to irrigate. In Nova Scotia, Halifax Water asked residents in Dartmouth and nearby areas to conserve water and some wells ran dry along the Eastern Shore. Hot weather led to **increased water use,** which caused discolored water in Moncton, N.B. During July and August, abnormal dryness was introduced in northern New Brunswick, parts of mainland Nova Scotia, southern Maine, and New Hampshire. Rain at the end of August from post-tropical cyclone Erin **improved dry conditions** in Nova Scotia and parts of New England.

Right Whales

From June through July, eight North Atlantic Right Whales **were found dead**, mainly in the Gulf of St. Lawrence. Increased numbers of the whales in the Gulf are thought to be linked to **warming ocean temperatures** and shifting of the location of the whales' food sources.

Regional Outlook – *Autumn 2019*

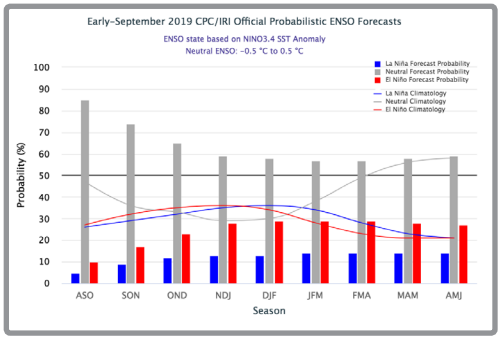
Temperature and Precipitation



For **September–November**, NOAA's Climate Prediction Center (CPC) and Environment and Climate Change Canada (ECCC) favor an **increased chance of above-normal temperatures** for New England, Nova Scotia, southern New Brunswick, and central and eastern P.E.I. Equal chances of below-, near-, or above-normal temperatures were forecast for western P.E.I. and central and northern New Brunswick. For **precipitation**, both groups call for **equal chances** in the region for September–November.

CPC temperature map (above left) produced August 15.
ECCC temperature map (above right) produced August 31.

ENSO



During August, **ENSO-neutral conditions** were observed in the equatorial Pacific Ocean. NOAA's Climate Prediction Center indicates there is around a 75% chance that ENSO-neutral conditions will continue through winter 2019–20 and a 55%–60% chance that these conditions will continue through spring 2020.

Atlantic Hurricane Season

NOAA's updated 2019 Atlantic hurricane season outlook indicates an **above-normal season is most likely**, with "10–17 named storms [winds of 63+ km/h (39+ mph)], of which 5–9 will become hurricanes [winds of 119+ km/h (74+ mph)], including 2–4 major hurricanes [Category 3, 4, or 5; winds of 179 km/h (111+ mph)]." The increase is due to ENSO-neutral and other favorable conditions. The season runs from June 1–November 30, peaking from mid-August–late October.

	2019 Atlantic Season Outlook	Average Season
Number of Named Storms	10-17	12
Number of Hurricanes	5-9	6
Number of Major Hurricanes	2-4	3

Contacts

National Oceanic and Atmospheric Administration

Environment and Climate Change Canada

Northeast Regional Climate Center

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Gulf of Maine Council on the Marine Environment
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