



Gulf of Maine Significant Events - September–November 2017

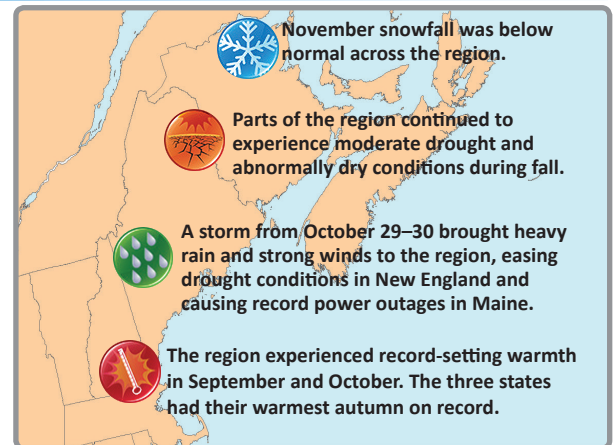
During autumn, **moderate drought and abnormally dry conditions** generally improved in New England and New Brunswick but were variable in Nova Scotia and P.E.I. See Impacts section for details.

Unusually **warm temperatures** of up to 34°C (94°F) set dozens of records from **September 23–27**. Some Maritimes sites were within 2°C (4°F) of their all-time maximum temperature records for September. Many parts of P.E.I. were **hotter during this period** than they were all year, which **extended the beach season** in the province. Concord, NH, had its latest-occurring heat wave (three or more consecutive days of at least 32°C [90°F]) in a calendar year. Also, Caribou, ME, did not record a temperature below 4°C (40°F) until September 29, its latest on record.

Mild maximum and minimum temperatures set **many records** from **October 8–10**. For instance, Caribou had its warmest October minimum temperature on record on the 8th. From **October 19–27**, a **prolonged warm spell** with highs up to 25°C (77°F) resulted in new temperature records being reported almost every day in the Maritimes. On October 25, Caribou broke its record for warmest October minimum temperature that was set earlier in the month. In fact, Caribou's three warmest minimum temperatures for October were all set/tied in 2017.

From **October 24–26**, the region received up to 214 mm (8.42 inches) of rain, with the greatest amounts in New Hampshire, Maine, and western New Brunswick. The **heavy rain** resulted in flooded roads. **Winds** up to 90 km/h (56 mph) downed trees and wires, causing power outages. **Stormy weather** and **southerly winds** caused problems for migratory birds. **Another storm** brought up to 132 mm (5.19 in.) of rain and wind gusts up to 129 km/h (80 mph) to the region from **October 29–30**. There were numerous impacts, particularly in New England. See Impacts section for details.

With highs up to 25°C (77°F) on **November 3 and 6**, many **records were set** in the Maritimes. Lows down to -11°C (12°F) from **November 11–13** set **record lows**.



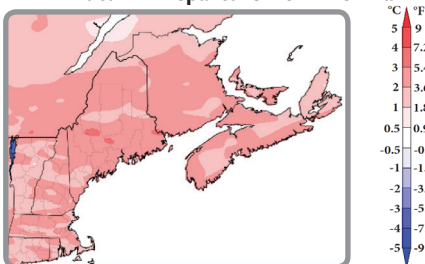
From **November 22–23**, a strong storm brought **heavy rain and wind gusts** of up to 146 km/h (91 mph) to the Maritimes, **downing trees** and causing **power outages**.

The 2017 Atlantic hurricane season was **extremely active**, with 17 named storms, 10 of which were hurricanes, and six of those becoming major hurricanes. Four tropical cyclones affected the region in autumn: Tropical Storm Jose brought heavy rain, strong winds, rough surf, flooding, and erosion to New England in mid-September, and remnant moisture from Maria, Nate, and Philippe enhanced rainfall totals during storms in late September and early and late October.

Regional Climate Overview - September–November 2017

Temperature

Autumn Departure from Normal

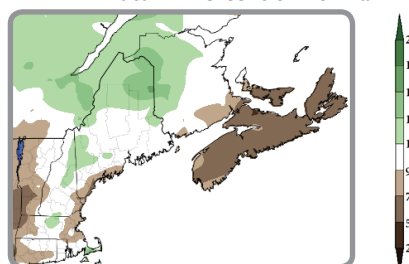


Autumn temperatures (averaged over September, October, and November) were up to 3°C (5°F) warmer than normal. The three states had their warmest autumn on record, as did Concord, NH. Several Maritimes sites had their warmest or second warmest autumn. The warmth led to **increased tick reports** in Nova Scotia. **September** temperatures were up to 4°C (7°F) above normal. The three states, and nine sites, ranked this September among their five warmest on record. **October** temperatures were up to 5°C (9°F) above normal. The three states had a record warm October, and 13 sites had their warmest or second warmest October. **November** temperatures ranged from 2°C (4°F) below normal to near normal for most of the region except parts of central and eastern Nova Scotia, which were up to 2°C (4°F) above normal.

Temp and precip normals based on 1981–2010 data.

Precipitation

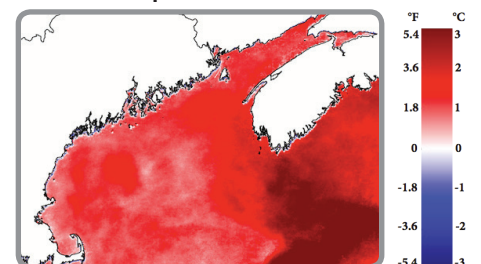
Autumn Percent of Normal



Autumn precipitation (accumulated from September–November) ranged from 50%–150% of normal. **September** precipitation ranged from 25%–110% of normal for most of the region, except in central/eastern Nova Scotia, northern New Brunswick, and Cape Cod, MA, which saw up to 175% of normal. In **October**, most of the Maritimes were much drier than normal, while western New Brunswick and New England were wetter than normal. Precipitation ranged from less than 25% of normal in Cape Breton, NS, to more than 200% of normal in New England. This October was among the five driest at several sites in Nova Scotia and P.E.I., with a few sites being record dry. However, in the three states, this October was among the ten wettest. **November** precipitation ranged from 25% of normal in Nova Scotia and New England to 175% of normal in northern New Brunswick.

Sea Surface Temperatures

Departure from Normal



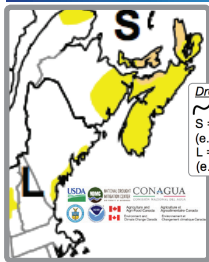
Autumn sea surface temperature anomalies in the Gulf of Maine region were above the fall long-term average over the entire region, continuing the trend of summerlike ocean temperatures **persisting into the fall**. These warm anomalies were strongest over the Scotian Shelf (around 2°C [4°F]), especially over the southern Scotian Shelf (greater than 3°C [5°F]). Within the Gulf of Maine, anomalies were 1°–1.5°C (2°–3°F) above the long-term average, with the weakest anomalies in the near coastal waters along the Massachusetts and New Hampshire coasts.

There were 16 **right whale deaths** in 2017 (12 in Canada and four in the U.S.) out of a population of 450.

Sea surface temperature anomalies based on 1985–2017. Mean SST anomalies from NOAA AVHRR data. Credit: University of Maine School of Marine Sciences and NERACOOS



Regional Impacts - September–November 2017



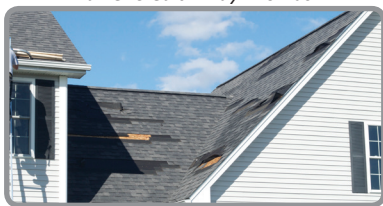
Intensity:
 D0 Abnormally Dry
 D1 Drought - Moderate

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

The November 2017
 North American
 Drought Monitor.



Above: Forest fire east of Fredericton, NB, on October 23, 2017. Credit: Rick Fleetwood. Below: Roof damage from high winds during the October 29-30 storm in Maine. Credit: Andy Thomas.



Dry Conditions

In September, moderate drought and abnormal dryness persisted for much of the region. In October, moderate drought and abnormal dryness lingered or expanded in Nova Scotia, P.E.I., and southern New Brunswick. Heavy rain in late October eased moderate drought in New England and western New Brunswick, but abnormally dry conditions remained. In addition, temperatures were above normal in September and October. In November, moderate drought and abnormal dryness expanded in Nova Scotia and P.E.I. Moderate drought eased in New Brunswick but abnormal dryness lingered. Dryness also persisted in Maine.

Dry conditions during summer and autumn contributed to decreased honey production in [New Brunswick](#) and [Maine](#) and [reduced potato yields](#) in P.E.I.; although, the weather allowed for a faster potato harvest. Fire danger was [elevated in Maine](#) and the Maritimes during fall. There were several wildfires, including three fires that caused [poor air quality](#) in Fredericton and southern York County, N.B. The number of forest fires in New Brunswick was above the 10-year (2007–2016) average as of October 30. The late October rainstorms eased wildfire concerns in the region.

River flows were below normal in much of the region in September and October. A few waterways in New England and New Brunswick were at record or near-record low flows in mid-October. Groundwater was also below normal in parts of New England. In Maine, there were some reports of shallow wells going dry in October. After the late October rainstorms, river flows returned to normal or above normal for the region, except in P.E.I., and groundwater returned to normal in most of New England.

October 29–30 Storm

A strong storm, enhanced by remnant moisture from Tropical Storm Philippe, brought high winds and heavy rain to the region in late October. The winds downed trees, which were still in leaf and, in Maine, [damaged by drought](#). The trees took down wires, with more than [1,400 poles snapped](#) in Maine. Over 1 million customers in New England lost power, including more than 400,000 Central Maine Power customers, making it the [“largest number of outages”](#) in the company’s history.” Some customers in Maine were without power for nearly a week. Heavy rain caused flash flooding in the three states. Due to debris and flood damage, hundreds of roads in New England were closed, some for over a week. In Belfast, ME, the wind and waves caused several [boats to break loose](#) from their moorings. [In the Maritimes](#), more than 10,000 customers lost power and ferry service was disrupted. Dozens of schools were closed across the Gulf of Maine region, with some already having to [extend the school year](#) farther into summer.

Regional Outlook - Winter 2017-18

Temperature and Precipitation

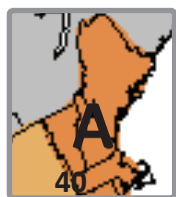
As of mid- to late November, the [Environment and Climate Change Canada \(ECCC\)](#) and [NOAA’s Climate Prediction Center \(CPC\)](#) temperature outlooks favored above-normal December–February temperatures for the entire region. In New England, the increased chance for warmer-than-normal temperatures is primarily due to long-term climate trends.

ECCC was predicting equal chances of below-, near-, or above-normal precipitation for December–February for the Maritimes. CPC was forecasting an increased chance of above-normal precipitation for northern New Hampshire and parts of western and northern Maine, with equal chances elsewhere in New England.



Prob (%) above normal/
 au dessus de la normale

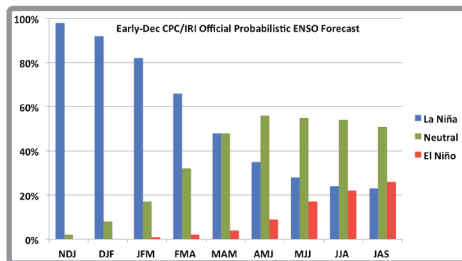
ECCC temperature map (left) produced on November 30. CPC temperature map (right) produced on November 16.



Probability of above-normal (A)

33 40 50

La Niña



La Niña conditions were present in the equatorial Pacific Ocean as of mid-December. According to NOAA’s Climate Prediction Center, there is a greater than 80% chance that [La Niña conditions will continue](#) through winter 2017–18.

La Niña can influence the region’s temperature and precipitation patterns. However, this La Niña is expected to be weak to moderate, so its impacts may be more variable. Also, other patterns of climate variability such as the [Arctic Oscillation](#), the [North Atlantic Oscillation](#), and the [Madden-Julian Oscillation](#) may dominate the region’s weather patterns this winter. These patterns are less able to be forecast far in advance compared to La Niña, meaning that it is uncertain how they will affect the upcoming winter season. Long-term climate trends can also play a role. For more information for the Northeast U.S., see the [Northeast Winter Climate Patterns and Outlook document](#).

Gulf of Maine Region Partners

- Environment and Climate Change Canada
www.ec.gc.ca
- Northeast Regional Climate Center
www.nrcc.cornell.edu
- National Oceanic and Atmospheric Administration
www.noaa.gov
- National Centers for Environmental Information
www.ncei.noaa.gov
- National Operational Hydrologic Remote Sensing Center
www.nohrsc.noaa.gov
- NOAA Sea Grant Network
www.seagrant.noaa.gov
- Northeast River Forecast Center
www.erh.noaa.gov/nerfc
- Climate Prediction Center
www.cpc.ncep.noaa.gov
- Regional Climate Services
www.ncdc.noaa.gov/rcsd
- Gulf of Maine Research Institute
www.gmri.org
- State Climatologists
www.stateclimate.org
- National Integrated Drought Information System
www.drought.gov
- Cooperative Institute for the North Atlantic Region
www.cinar.org
- Gulf of Maine Council on the Marine Environment, Climate Network
www.gulfofmaine.org/climatenetwork
- Northeastern Regional Association of Coastal and Ocean Systems
www.neracoos.org
- University of Maine, School of Marine Sciences
www.umaine.edu/marine

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