



Gulf of Maine Significant Events - for December 2013–February 2014

A storm system brought a thick layer of ice and more than 30 cm (12 in.) of snow to much of the region from December 20–23. The airport in Saint John, NB, reported 53 hours of freezing precipitation. The storm left over 170,000 customers in southern New Brunswick and over 100,000 customers in Maine without power for up to 11 days. Bitterly cold temperatures followed the storm with recorded lows of below -25°C (-13°F).

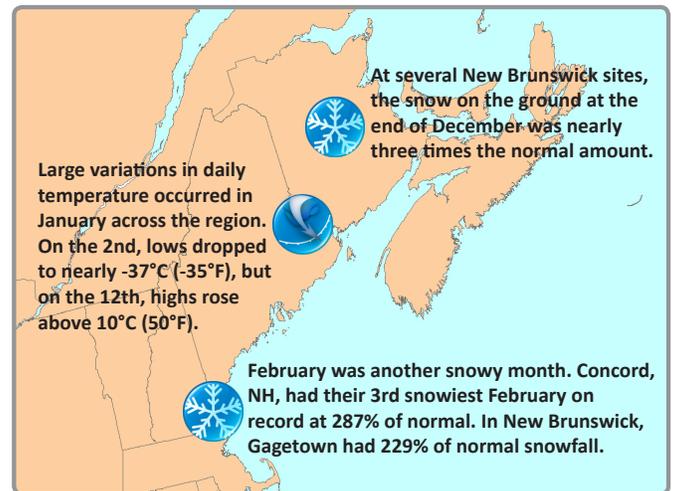
From January 2–3, a Nor'easter dropped up to 61 cm (24 in.) of snow, mainly on coastal New England. The storm packed high winds, which led to blizzard conditions and flooding in southeastern Massachusetts.

Records indicate that each January there tends to be a thaw, usually lasting a few days. This January's thaw, which occurred around mid-month, was quite warm and persistent. In many communities, highs neared or exceeded 10°C (50°F) for more than a week. The mild conditions resulted in ice movement on many rivers as well as significant snow loss.

Freezing rain, rain, and high winds caused transportation problems from January 11–12 in New Brunswick. Bathurst, for example, had 10 hours of freezing rain and a wind gust of 96 km/h (60 mph) was reported in Saint John.

A flash freeze event occurred in New Brunswick on January 27 when temperatures dropped from above-freezing to below-freezing in a short period of time. For example, Doaktown had a 13°C (23°F) temperature variation in one hour.

An intense low pressure system brought blizzard conditions to much of the Maritimes on January 22. There were reports of near-zero visibilities, snowfall amounts of up to 30 cm (12 in.), and wind gusts to 80 km/h (50 mph), with a local maximum of 102 km/h (63 mph) on the Eastern Shore.

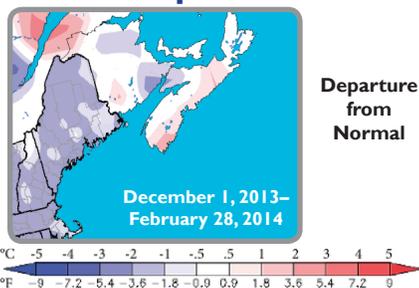


Up to 51 cm (20 in.) of snow fell on parts of the region from February 15–16. Winds greater than 100 km/h (62 mph) caused blizzard conditions in several Maritimes communities, downed trees, and left thousands without power. A storm surge in excess of 1 m (3.3 ft.) was reported, but widespread flooding did not occur.

Caribou, ME and Concord, NH set records for consecutive days with measurable snowfall. Caribou had 13 such days from December 15–27, while Concord had seven such days from December 9–15.

Regional Climate Overview - for December 2013–February 2014

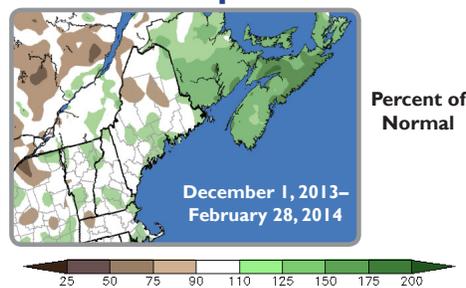
Temperature



December was significantly colder than normal, with departures as low as -7°C (-12.6°F). January was generally milder, with average temperatures just below to just above normal. February departures ranged from -2.2°C (-4°F) in the U.S. and northern Maritimes to near or slightly above normal elsewhere. For winter, temperatures ranged from slightly below normal in the U.S. to near or just below normal across the Maritimes.

This winter, arctic air moved into the eastern U.S. and Canada, while warmer air moved into the western U.S. and Canada, due in part to the polar vortex. The polar vortex is a permanent, large-scale area of low pressure in the upper atmosphere near the poles that contains very cold air. When the polar vortex is strong, the cold air is kept in place. When the polar vortex weakens, cold air moves south via the jet stream in some areas while other areas warm up.

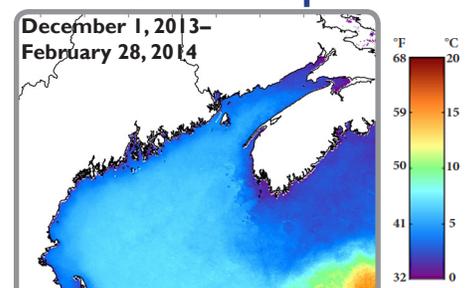
Precipitation



Most of the region received near to above-normal precipitation in December. Northern Nova Scotia was the wettest area at 200–225% of normal precipitation. Overall, the Maritimes and much of Maine received up to 200% of normal precipitation in January, but western Maine and coastal New Hampshire and Massachusetts received 50–90% of normal. February was generally wetter than normal, with parts of New Brunswick and coastal Massachusetts seeing 200–225% of normal precipitation. Midcoast Maine, however, was drier at 75–100% of normal. For winter, the Maritimes received above-normal precipitation, with up to 175% of normal in some areas, while the rest of the region received near-normal amounts.

Temperature and precipitation normals based on 1981–2010.
 Canada precip data: [Canadian Precipitation Analysis](#).
 U.S. precip data: interpolated station data

Sea Surface Temperatures



Mean Sea Surface Temperatures from NOAA AVHRR data. Credit: University of Maine School of Marine Sciences and NERACOOS

The mean sea surface temperature (SST) during winter in the central Gulf of Maine and Georges Bank was $5\text{--}10^{\circ}\text{C}$ ($41\text{--}50^{\circ}\text{F}$). Cooler temperatures were found along the Scotian Shelf, Bay of Fundy, and New England coast, where the mean SST was $0\text{--}5^{\circ}\text{C}$ ($32\text{--}41^{\circ}\text{F}$). SSTs in the Gulf of Maine during December and January were generally warmer than normal, especially in the central Gulf. Temperatures near land and on the western Scotian Shelf were the notable exception. In February, most of the Gulf of Maine was warmer than normal, with the western Scotian Shelf also warming to above-average temperatures. However, colder than normal temperatures remained near the New England coast.

SST normals based on 1981–2010

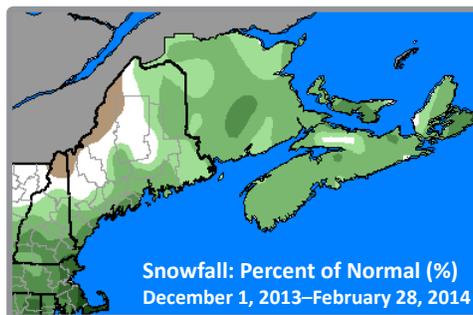
Regional Impacts - for December 2013–February 2014

Energy

It cost \$12 million for NB Power to restore power in New Brunswick after winter storms in late December and early January. More than 88,000 customers were without power at some point during this period, with some experiencing as many as six outages. Increased demand and decreased stockpiles caused the price of natural gas and other fuels to rise this winter, with a few companies seeking approval for midwinter rate increases. The increased demand for wood pellets caused a shortage in some areas. (See <http://metronews.ca/news/canada/955454>)

Snow

The tough winter has resulted in considerable efforts to ensure road safety. Through late February, the Maine Department of Transportation had spent \$25.4 million on clearing snow and treating roads compared to \$15.7 million during an average winter. At the city level, Truro, NS, spent 35% more than its allotted budget for snow and ice removal as of late February. Road salt usage was up this winter, as well. In mid-February, the Maine Department of Transportation anticipated this season would have the highest use of salt in six years. (See <http://bangordailynews.com/2014/02/23/news/state/maine-department-of-transportation-spending-10-million-more-than-average-to-keep-roads-clear-this-winter>)



Most of the region received above-normal snowfall during winter. The Cape Cod area of Massachusetts was the snowiest part of the region at more than 200% of normal. The Maritimes and most of Maine and New Hampshire received near to above-normal snowfall as well, with departures of 90-200% of normal. However, western Maine and northern New Hampshire received below-normal snowfall, with departures of 75-90% of normal.

Recreation

Participation in cold-weather dependent activities was on the rise in December. Thick ice formed earlier this winter than in past years on Maine's lakes, jump-starting the ice fishing season. The early freeze allowed the ice to be hard enough to hold the Sebago Lake Ice Fishing Derby for the first time in three years. During the week between Christmas and New Year's, every cross county and downhill ski center in the state of Maine was open, which is unusual, according to the Ski Maine Association. However, a January thaw forced Crabbe Mountain in central New Brunswick to close for a few days, costing the ski area thousands of visits. While February storms brought snow to the ski center, they also brought power outages and other challenges. (See http://www.pressherald.com/news/ice_fishing_season_weeks_early_on_Sebago_Lake_.html)

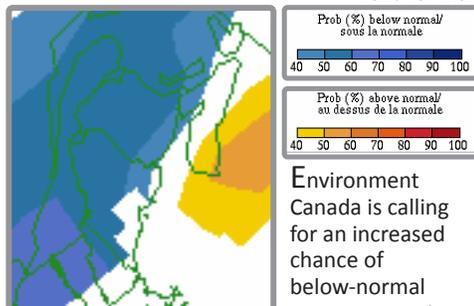
Insects

Regional entomologists say that low temperatures will likely limit this year's winter moth population. Research is underway to determine if cold temperatures cause greater mortality in adults (which mate in December and need temperatures above freezing) or in moth eggs - which freeze when temperatures fall below -29°C (-20°F). The spread of hemlock woolly adelgid was also likely slowed by winter mortality. (See http://www.pressherald.com/news/Hate_the_cold_Bugs_don_t_fare_well_either_.html)

Regional Outlook - for Spring 2014

Temperature & Precipitation Outlooks

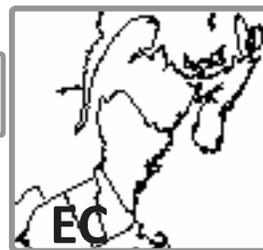
Valid for March–May 2014



Environment Canada is calling for an increased chance of below-normal temperatures in

Quebec and New Brunswick for March–May. The seasonal forecast is based on a group of twenty forecasts produced with two Canadian climate models coupled with an oceanography model. Some of the factors influencing these models are sea surface temperature, sea ice, and land snow cover. The below-normal temperature forecast is, to a degree, attributed to the greatest sea ice coverage of the past 20 years (in the Atlantic Canada marine area) and the southern edge of snow cover being further south than normal. In addition, the polar vortex, which was partly responsible for the harsh winter in parts of Canada and the U.S., is expected to slowly weaken and drift eastward over the next few months. All these factors contribute to a moderate to high probability of below-normal temperatures this spring. There is an exception for southwestern Nova Scotia, where above-normal sea surface temperature has been observed and is expected to keep air temperatures above-normal through the spring.

EC: Equal chances of above, near, or below normal



NOAA's Climate Prediction Center is forecasting equal chances of above-, near-, or below-normal temperatures for March–May in the Northeast U.S. This means that it is just as likely for the region to experience below-normal temperatures as it is to have above- or near-normal temperatures.

As for precipitation, the Climate Prediction Center is forecasting equal chances of above-, near-, or below-normal precipitation for spring. Environment Canada's precipitation forecast calls for a slightly elevated chance of above-normal precipitation in southern Nova Scotia and equal chances elsewhere.

There is an increasing chance of El Niño development from late spring through fall, which could influence weather patterns and hurricane season. El Niño is characterized by unusually warm sea surface temperatures in the central and eastern Pacific Ocean near the equator.

Gulf of Maine Region Partners

- Environment Canada
www.ec.gc.ca
- Northeast Regional Climate Center
www.nrcc.cornell.edu
- National Oceanic and Atmospheric Administration
www.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.noaa.gov
- Regional Climate Services
www.rcsdhome.org
- 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

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This is a new publication designed to help others understand climate trends and their impacts. We welcome your feedback.

