

PRAIRIES and HIGH PLAINS

Weather and Climate Highlights and Impacts, September to November 2023
Climate Outlook, January to March 2024



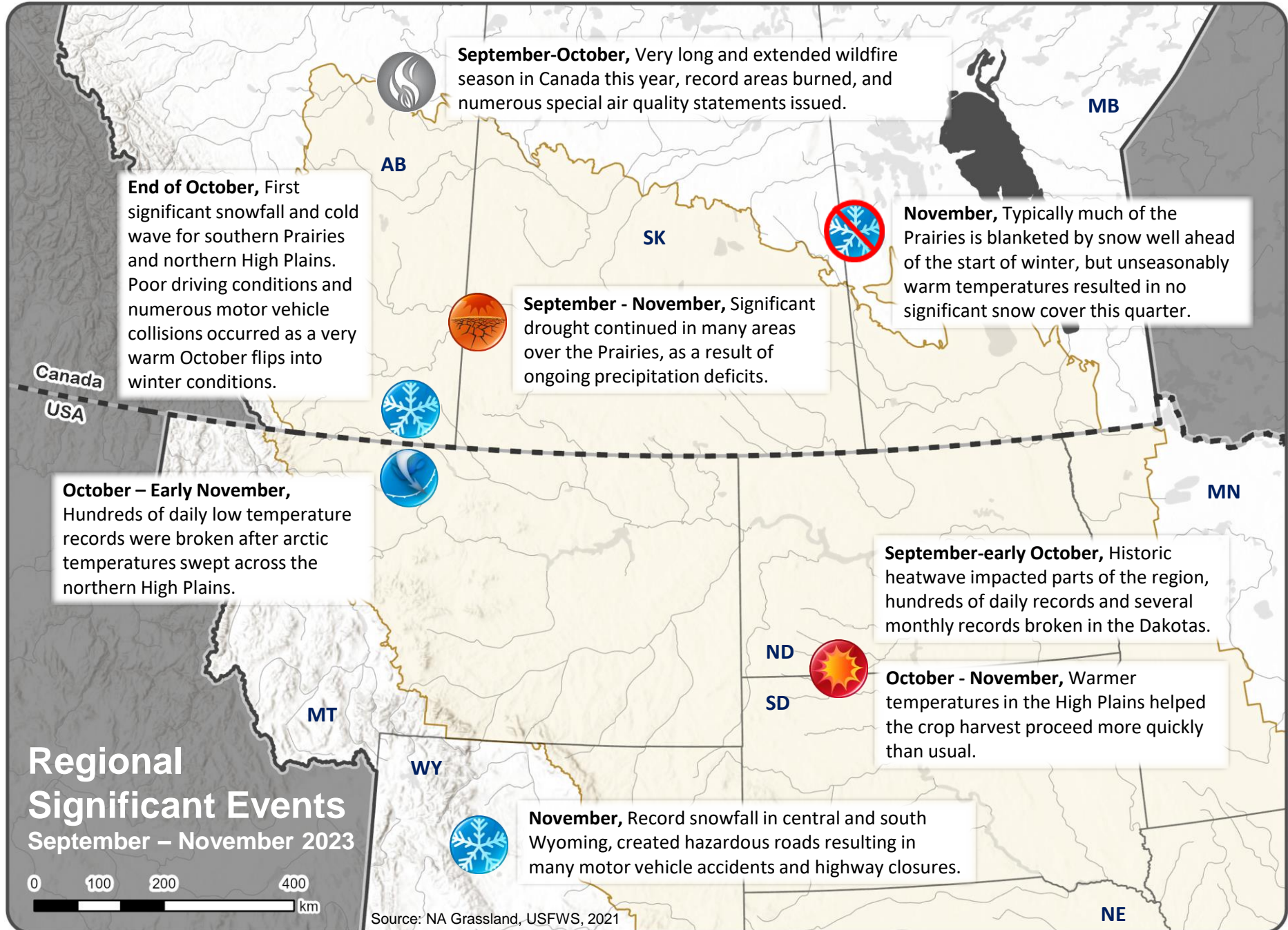
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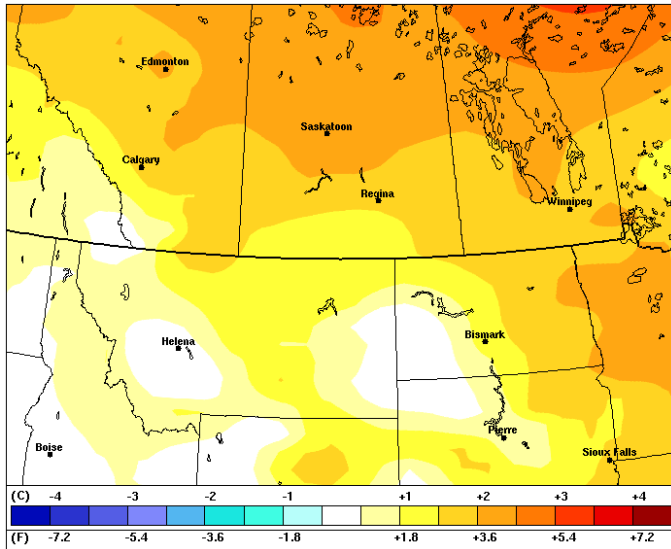
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Regional Climate Overview

September – November 2023

Departure from Normal Temperature (°C/°F)

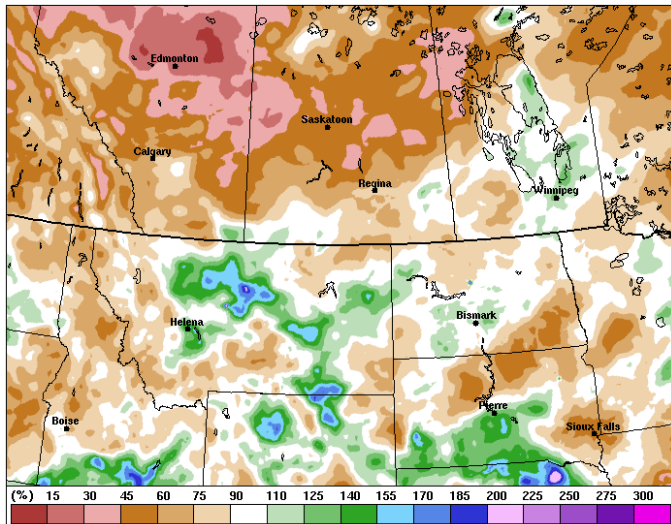


Source: ECC Climate Archive and USHCN v 2.5
Reference period: 1991-2020

Temperature

The Prairies and High Plains generally experienced warmer fall conditions, except the area that borders Montana and the Dakotas. September and early October saw above normal temperatures, especially in the eastern section. A brief cold outbreak in late October, extending into the early parts of November, lowered temperatures to below normal levels before returning to a warmer pattern for the remainder of November.

Percent of Normal Precipitation (%)

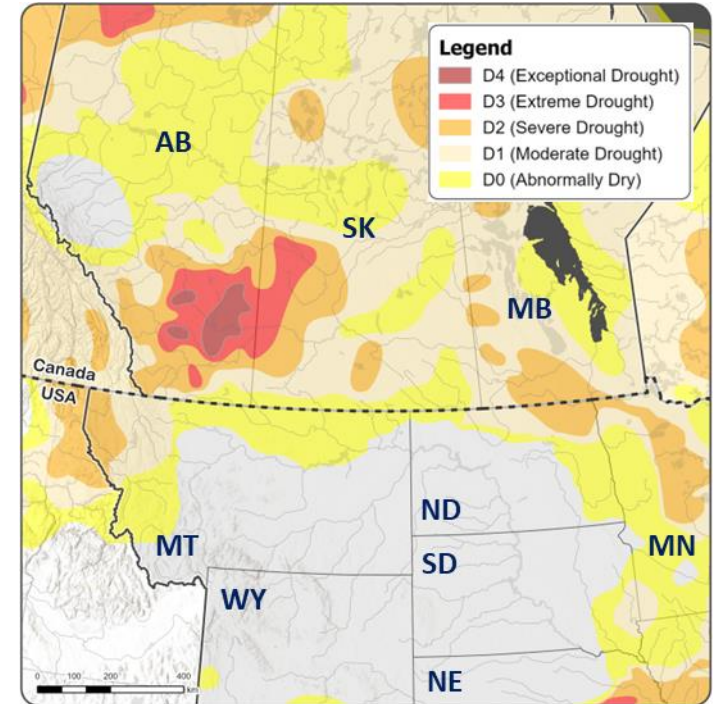


Source: Canadian Precipitation Analysis (CaPA)
Reference period: 1991-2020

Precipitation

Precipitation was well below normal for much of the Prairies, with parts of central Alberta receiving less than 30% of its seasonal amount. Western Minnesota, eastern and central Dakotas mostly exhibited drier conditions. Meanwhile, scattered regions in Montana, Wyoming and southern parts of South Dakota saw slightly wetter than normal conditions this fall, especially from September to October.

Drought Monitor



Source: North American Drought Monitor

Drought Conditions as of November 30, 2023

An overall dry fall led to significant drought persisting across the region in September, with Extreme (D3) to Exceptional Drought (D4) reported along the southern Prairies and northern High Plains. Snow and rain in October and November led to improvements in many areas. However, southern Alberta remained in Severe (D2) to Exceptional Drought (D4) by the end of the quarter, reporting significantly low reservoir levels, concern for sourcing feed supplies and low river and lake levels; this area remains vulnerable to significant drought impacts going into the winter. Much of the southern Prairies and the High Plains region also reported significantly low snow coverage by the end of November, likely a result of low precipitation and warmer than normal monthly temperatures.

Regional Impacts

September – November 2023

Drought and Agricultural Impacts



Southwest Montana I-90 corridor between Wyola and Aberdeen.
Photo Credit: Lee Schmelzer

Location: Prairies and High Plains

Crop harvest progressed mostly on time this Fall across the region, thanks to above normal temperatures in most areas. However, drought in western Canada and the northern High Plains reduced production, including for [all principal field crops in Canada](#) by an estimated 8% compared to the five-year average. Some crops in the Canadian Prairies experienced much larger impacts, such as durum wheat, with an estimated supply reduction of 23% below the five-year average. That said, crop quality and protein content were good. In southern portions of the region, such as southern [Montana](#) and northern [Wyoming](#), moisture was more abundant during the growing season, so harvest season revealed some of the best yields in recent memory, especially for hard red winter wheat and third-cutting hay. Many areas of the Prairies and High Plains had low snow cover through late November, which allowed livestock to continue grazing, although nutrient levels in grasses are usually low during this time of year, requiring careful management to ensure enough nutrition. In North Dakota, the unusually long grazing season contributed to another [cattle herd being exposed to anthrax](#); this was detected at the end of November, which is unusually late but not unprecedented.

Water Supply Concerns



Unusually low water levels at Crowsnest River, Alberta in November.
Photo Credit: Alberta Environment and Protected Area

Location: Prairies and High Plains

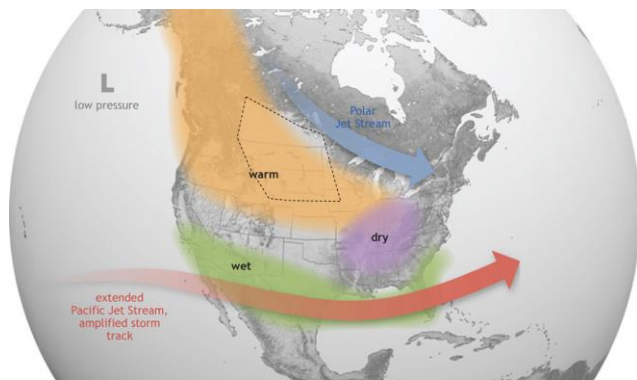
Long-term [drought conditions](#) across much of the Canadian Prairies, northern Montana, North Dakota and Minnesota have reduced streamflow and caused widespread water supply concerns going into winter. Water bodies, such as Oldman River and St. Mary Reservoirs, two key reservoirs in southern Alberta, reported record or near record low levels in November. These reservoirs not only supply the agricultural community with irrigation, but also provide drinking water to several local communities, including [Lethbridge](#). Manitoba Hydro has been forced to begin [operations at its Brandon natural gas-fired generating station months earlier than normal](#), as a result of widespread drought conditions leading to lower than normal hydroelectric power generation. Two of the three main rivers that feed hydroelectric generation in the province have reported near record low streamflow.

Temperature and Precipitation Outlook

January – March 2023

The Winter temperature outlooks from both [American](#) and [Canadian](#) models show an enhanced chance of above normal temperatures for most of the domain, apart from southern Wyoming and southern South Dakota where equal chances for above and below normal are forecast. The precipitation outlook suggests equal chances for above and below normal precipitation over much of the Prairies and High Plains, except for western Montana where drier than normal conditions are forecast.

ENSO Outlook for Prairies and High Plains – An El Niño event has formed and is anticipated to continue through the upcoming winter and spring seasons. Based on the [latest advisory](#) issued by the NOAA Climate Prediction Center (CPC), the most recent [Oceanic Niño Index](#) (ONI) value (September – November 2023) is 1.8°C, which meets the criteria for a strong El Niño episode ($\geq 1.5^\circ\text{C}$). While strong El Niño episodes can increase the likelihood of climate anomalies, they do not necessarily equate to stronger impacts.



During El Niño winters, the persistent Pacific jet streams tend to stay further south of the High Plains, while the Polar jet streams tend to track further north of the Prairies. Being more distanced from winter storm tracks, the chances of milder and drier conditions are increased for the Prairies and High Plains.

Table: Three-month running mean ONI for the most recent two years. Warm (red) and cold (blue) periods based on a threshold of +/- 0.5C for ONI.

Year	DJF	JFM	FMA	MAM	AMJ	MJJ	JJA	JAS	ASO	SON	OND	NDJ
2022	-1.0	-0.9	-1.0	-1.1	-1.0	-0.9	-0.8	-0.9	-1.0	-1.0	-0.9	-0.8
2023	-0.7	-0.4	-0.1	0.2	0.5	0.8	1.1	1.3	1.6	1.8		

Diagram and Table Credit: [National Oceanic and Atmospheric Administration](#)

Two-thirds of the past 12 moderate-to-strong El Niño winters since 1950 had [above normal temperatures](#) and [below normal snowfall](#) for this region, overall. While an El Niño winter does not guarantee these temperature or snowfall anomalies, it favors the odds towards them. The lower precipitation outlook, if realized, would prolong the ongoing drought for much of the Prairies and the northern High Plains. A reduction in snowpack could lead to sub-optimal conditions for snow sports and expose soils to deeper freeze from cold air outbreaks. On a positive note, a milder and less snowy winter could lead to less heating and snow removal costs. In general, these ENSO signals are consistent with the current seasonal outlooks based on the [American](#) and [Canadian](#) climate models.

PRAIRIES and HIGH PLAINS

Contacts and Partners

- Environment and Climate Change Canada
www.canada.ca/en/services/environment
- Agriculture and Agri-Food Canada
www.agr.gc.ca/drought
- National Drought Mitigation Center
<http://drought.unl.edu/>
- NOAA NIDIS
www.drought.gov
- US State Climatologist
<https://stateclimate.org/>
- NOAA NCEI
www.ncei.noaa.gov
- USDA Climate Hubs
www.climatehubs.usda.gov
- NOAA NWS Climate Prediction Center
www.cpc.ncep.noaa.gov
- High Plains Regional Climate Center
www.hprcc.unl.edu
- NOAA NWS Missouri Basin River Forecast Center
www.weather.gov/mbrfc
- USDA Natural Resources Conservation Service
www.nrcs.usda.gov



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