

S A S K A T C H E W A N



Preliminary Runoff Outlook

February 6, 2019

Prepared by: Flow Forecasting & Operations Planning - Water Security Agency

Executive Summary

The Water Security Agency (WSA) is preparing for 2019 spring runoff including issuing this preliminary runoff outlook. The projected spring runoff potential for the province, based on conditions as of February 1, 2019, is shown on Figure 1. It is important to note that this projection assumes average climatic conditions occurring between February 1 and the spring melt.

Conditions were dry before freeze-up over most of the southern and central areas of Saskatchewan (Figure 2). Much of northern Saskatchewan received above normal precipitation in the spring and summer of 2018, which resulted in wet conditions continuing throughout the Churchill River Basin. Precipitation in the fall was below normal across most of the province. Only areas in the southwest and west central areas experienced near normal fall precipitation.

Much of the province has experienced below normal snowfall thus far (Figure 3). Snowfall is well below normal between Regina and the Quill Lakes. Only areas on the western side of the province and through the northern grainbelt and southern portions of the boreal forest have received near normal winter precipitation thus far.

With the dry conditions at freeze-up combined with below normal winter precipitation so far, below normal spring runoff is expected across most of southern Saskatchewan. There is a band through the northern agricultural region and southern boreal forest where, based on current conditions, near normal snowmelt runoff is expected. Below normal snowmelt runoff is expected over the far north. While areas in the southwest corner of the province are currently snow free, normal snowfall between now and the snowmelt event is expected to generate a near normal runoff response in the Frenchman and Upper Swift Current Creek basins. Well below normal runoff is expected across the Qu'Appelle Basin.

The runoff potential could change as there is potentially another 8-10 weeks of winter remaining. However, with dry fall conditions and below average winter precipitation to date, it would take well above average precipitation in February, March and April to produce an above average spring runoff within most areas of the province in 2018.

As conditions change and get closer to spring, another updated runoff outlook report will be issue in early March.

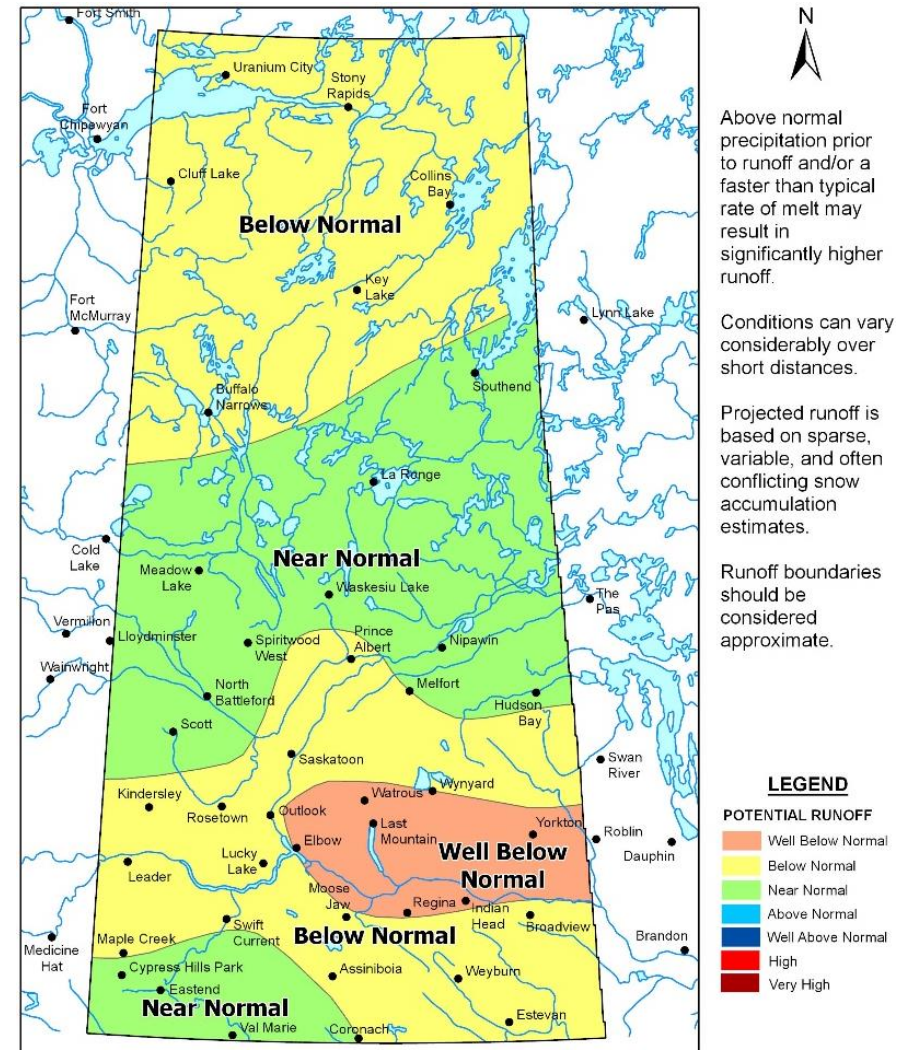


Figure 1: Spring Runoff Potential as of February 1, 2019

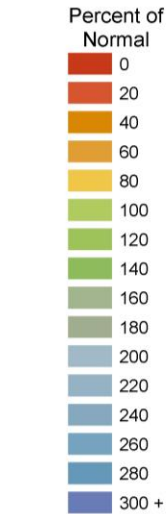
Cover Photo: Grant Devine Dam, December 13, 2016
Credit: Simone Manteri, WSA

Fall Conditions

Southern and central portions of Saskatchewan received below average rainfall in the spring and summer 2018. This resulted in drought conditions being experienced to some degree across most of the grain belt.

Further north, conditions were very wet throughout the Churchill River Basin as a result of the well above normal precipitation received in the spring and summer of 2018. This caused well above normal flows throughout the Churchill River system in 2018. The Beaver River basin also received above average rainfall in the fall, causing above normal flows throughout the system. The rest of the Churchill River Basin received below to average rainfall in the fall, which allowed flows to recede.

Fall brought some much needed precipitation to southern and central Saskatchewan. Although the fall precipitation brought some much needed moisture to these regions, available depression/wetland storage volumes remain high following the very dry conditions in the spring and summer and top soil moisture conditions were described as being short to very short across most of southern Saskatchewan at freeze-up. These conditions will reduce the spring runoff potential.



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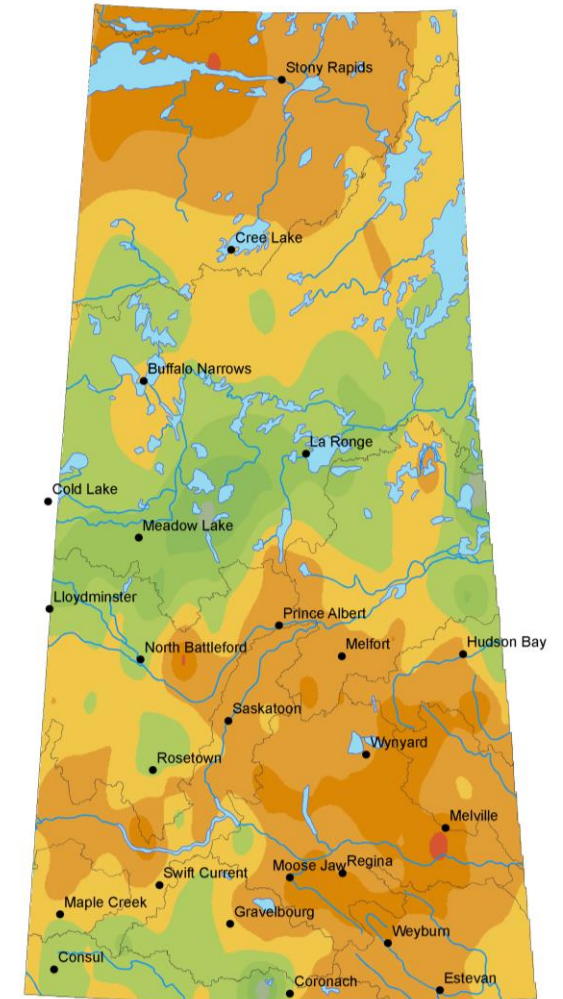


Figure 2: Percent Normal Precipitation
Aug. 3 to Oct. 31, 2018

Early Winter Precipitation

Point snowfall data, mapped as a percent of average, is provided in Figure 3. This map is based on a relatively small number of sites across Saskatchewan and, due to challenges of measuring point snowfall data in a windy environment and losses during the winter period, it may not represent the water equivalent available for runoff. This is particularly true for many areas where the snowpack was almost completely melted or sublimated due to periods of well above normal temperatures. However, this meltwater would have wetted the soil surface, reducing the infiltration capacity available for the melt of any late season snow.

There is reasonable agreement in the various data sources that there is well below average snowpack across southeastern portions of the province. Manual snow surveys will be completed in late February to confirm the snowpack conditions in advance of our early March Spring Runoff Forecast.

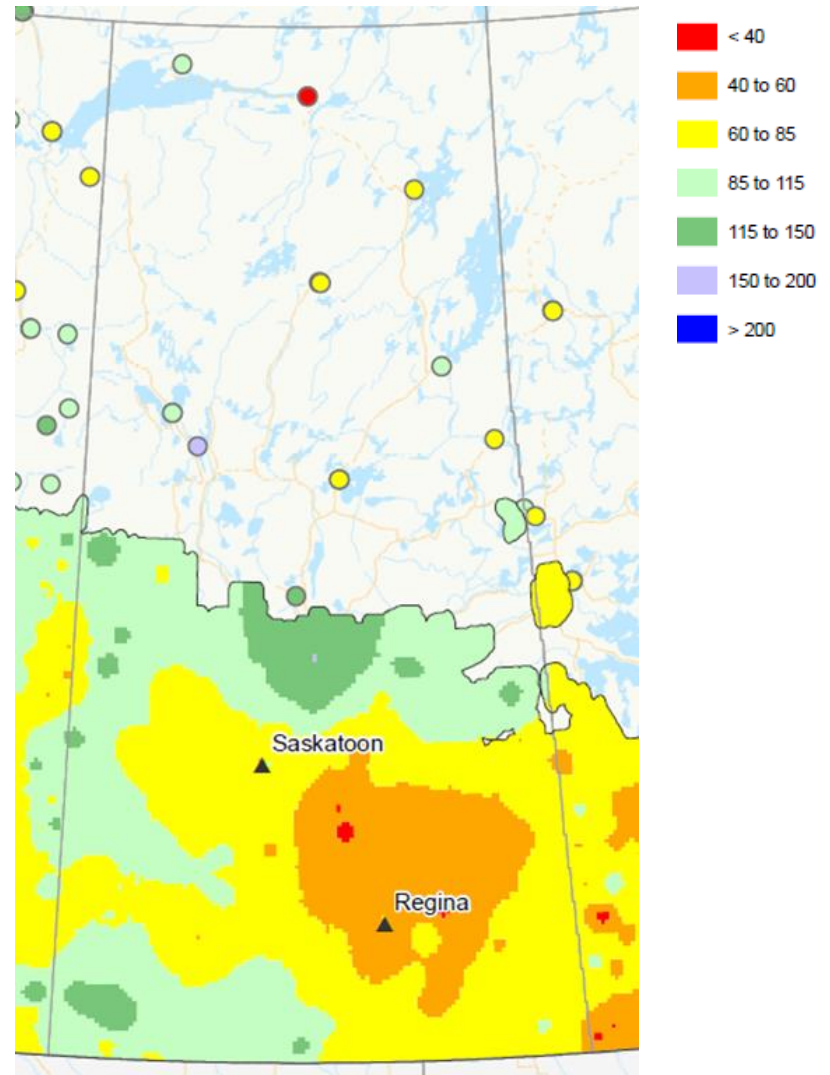


Figure 3: Percent Normal Winter Precipitation
November 1, 2018 to January 31, 2019
(Map Courtesy of Agriculture and Agri-Food Canada)

Long Range Forecasts

Most long lead precipitation forecasts are predicting near normal precipitation across the province for February, March, and April; however, some of these models are suggesting areas of above normal precipitation, particularly in the north. All seasonal models are also predicting warmer than normal conditions over this period. With that said, it is important to note that seasonal weather forecasts are largely unreliable. Their skill is particularly poor for precipitation.

Three month spatial anomalies maps for precipitation (Figure 4) and temperature (Figure 5) covering the February 1 to April 30 forecast period are provided here.

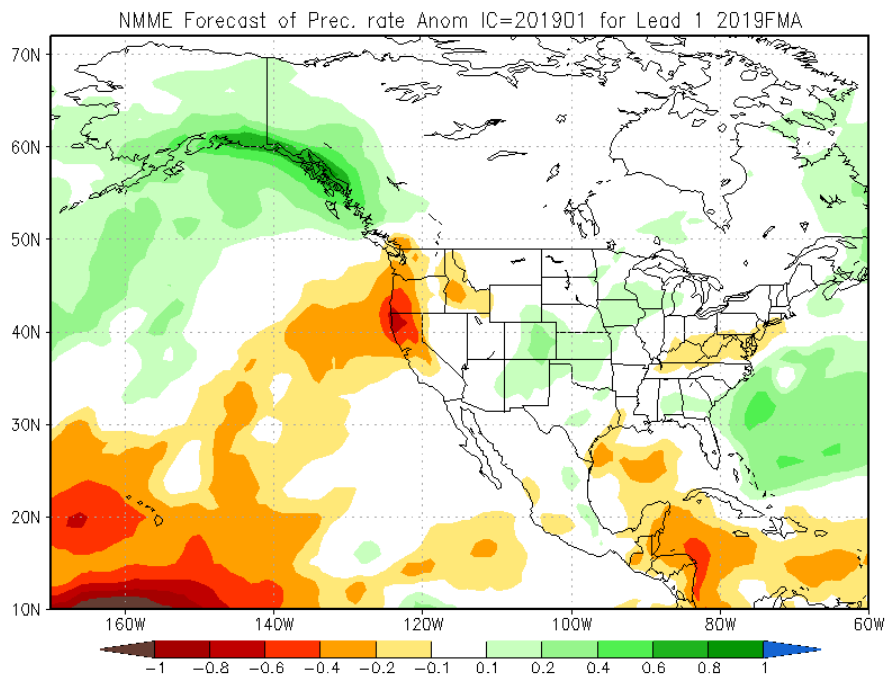


Figure 4: Multi Model Ensemble Precipitation Anomaly Forecast
(February 1, 2018 to April 30, 2019)
Map Courtesy of the US National Weather Service

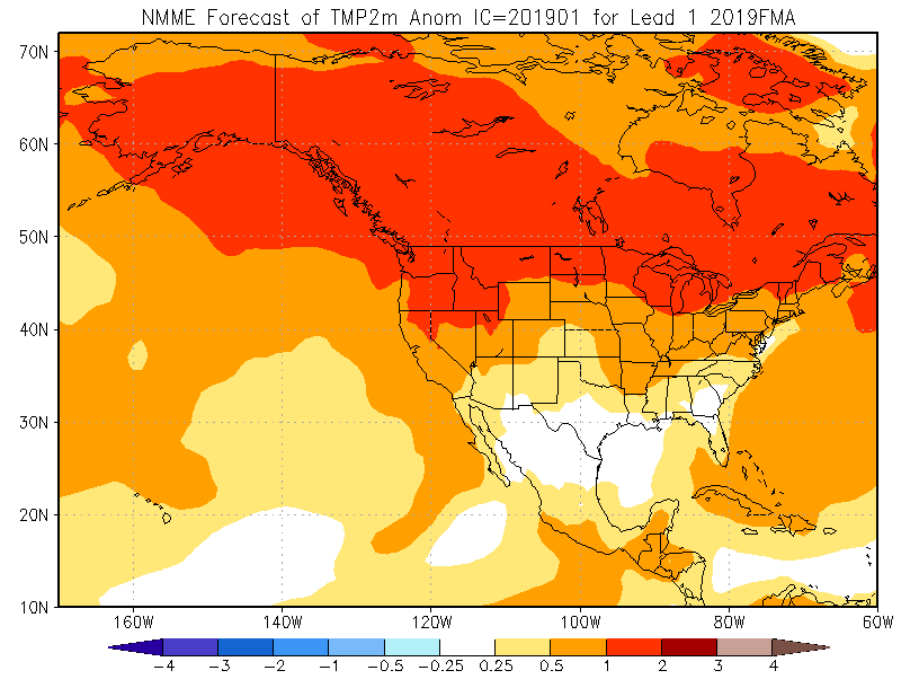


Figure 5: Multi Model Ensemble Temperature Anomaly Forecast
(February 1, 2018 to April 30, 2019)
Map Courtesy of the US National Weather Service

Water Supply Outlook

Souris Basin

Rafferty Reservoirs and Grant Devine Lake were below required drawdown levels prior to February 1. With dry conditions at freeze-up in 2018 and below normal snow within the basin, runoff within the basin is expected to be below normal in spring 2019 and additional drawdown of these reservoirs is not expected in 2019. It is anticipated that reservoir releases during the spring runoff period may be limited to what is required to meet international apportionment obligations.

Detailed forecasts for the Souris River Basin are developed on or near the 1st and 15th of each month, beginning in February, up until the snowmelt runoff event. These forecasts can be found on www.wsask.ca.

Saskatchewan River Basin

Winter inflows to Lake Diefenbaker have been near median. Lake Diefenbaker was at 552.6 m on February 1, 2019, which is about 40 cm above the median level for this time of year. Outflows were close to upper quartile by February 1. The reservoir is expected to be near median levels in late March or slightly higher in anticipation of a below normal prairie inflow.

Snow pillows operated by Alberta Environment and Parks at higher elevations within the alpine headwaters of the basin are showing below normal snow accumulation in the Oldman and the Bow River Basin. The snowpack in the Rockies typically peaks in late April or early May at the upper altitudes. As such, the snow accumulation season is only at the half way point. High flows on the system are also largely driven by significant summer rainfall events. For those reasons, it is much too early to develop a reliable spring and summer forecast for the Saskatchewan River System.

Flows on the North Saskatchewan River are above normal for this time of year. This, combined with above normal outflows from Lake Diefenbaker, is resulting in above normal flows on the Saskatchewan River.

Qu'Appelle System

Lakes in the Qu'Appelle Valley downstream of Craven are at below normal levels for this time of year. The exception is Pasqua and Echo lakes, which are at above normal levels. With conditions being dry, the WSA elected to leave the majority of the logs in the Echo Lake Control structure to safeguard against low levels in the summer of 2019.

The current expectation is for below to well below normal snowmelt runoff throughout the basin. As such, operations may be required in advance of the melt to maximize diversions into storage during the melt.

Churchill System

Runoff in the Churchill System is expected to be near normal levels in response to adequate soil moisture condition in the fall and a near normal snowpack.

Quill Lakes

Both Big Quill and Little Quill lake water levels are 520.44 m. Top soil moisture conditions were below normal at freeze-up in 2018 within the Quill Lakes basin. The Basin also has below normal snowfall to date. As such, below normal snowmelt inflows are currently forecasted for the Quill Lakes in 2019. A forecast for the post snowmelt runoff peak water level will be provided in our March forecast.

Next Forecast

The WSA will issue a Spring Snowmelt Forecast in early March.