

# Snow Survey and Water Supply Bulletin – May 1st, 2021

The May 1<sup>st</sup> snow survey is now complete and the [full report is available online](#) - you may need to refresh your browser. A map of the current snow basin indices can be found [here](#).

Data from 120 manual snow courses and 91 automated snow weather stations around the province (collected by the Ministry of Environment Snow Survey Program, BC Hydro and partners), and climate data from Environment and Climate Change Canada (ECCC) and the provincial Climate Related Monitoring Program have been used to form the basis of the following report.<sup>[1]</sup>

## Executive Summary

Overall, the May 1<sup>st</sup>, 2021 snowpack throughout British Columbia is slightly above normal. Very warm weather in mid-April created a significant melt of the low and mid-elevation snowpack. The average of all B.C. snow measurements decreased to 106% of normal (April 1<sup>st</sup>: 113%). The overall snow basin index for the entire Fraser River basin (e.g. upstream of the Lower Mainland) decreased to 109% from the April 1<sup>st</sup> index of 116%. High snowpack levels (>120%) are present in the Upper Fraser, Stikine, Northwest, Liard and Central Coast.

Typically, the provincial snowpack reaches its maximum level in mid-April. Onset of snowmelt has been observed in May, with 11% of the annual snow accumulation melted from April 15<sup>th</sup> to May 1<sup>st</sup> at automated snow weather stations. Significant additional accumulation to the current snowpack is not expected.

Snowpack is one element of seasonal flood risk in BC and is not the only predictor for whether flooding occurs. Spring weather is critical as it determines the rate that snow melts, and extreme rainfall also causes spring flooding. Spring freshet poses a seasonal risk across the BC Interior irrespective of snowpack levels.

## Weather

The weather in April was punctuated by a strong ridge of high pressure that persisted from April 14 to 18<sup>th</sup>. Many new daily maximum temperature records were set throughout the province during this period, which also resulted in the rapid melt of lower and mid-elevation snow.

Despite this period of hot weather in mid-April, temperatures throughout the province were near normal (between -2.0 and +2.0°C) when averaged across the entire month. Slightly cooler temperatures (between 0 and -2.0°C) occurred in the Northeast, Peace, Robson Valley, Prince George, Quesnel, and Terrace. An anomaly of extremely warm temperatures (>4.0°C) was centred in the southern Chilcotin/Bridge region, and encompassed Lytton, Lillooet, Pemberton, and Whistler.

April was a very dry month for much of the province. Areas that experienced extremely dry conditions (<40% of average precipitation) include the North Thompson, South Thompson, Lower Thompson, Vancouver Island, the South Coast, Fraser Canyon and Chilcotin Plateau. Well below normal (40 to 60%) precipitation was experienced predominantly in the Okanagan, Nicola, Lower

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<sup>[1]</sup> Every effort is made to ensure that data reported on these pages are accurate. However, in order to update the graphs and indices as quickly as possible, some data may have been estimated. Please note that data provided on these pages are preliminary and subject to revision upon review.

Fraser, and West Kootenay regions. Below Normal (60 to 85%) precipitation was measured in the Similkameen, Upper Fraser West, and Peace. Regions that experienced relatively normal monthly precipitation totals (85 to 115%) include the East Kootenay, Prince George, and Quesnel. The Upper Columbia, Skeena/Bulkley, and Upper Fraser East experienced a mix of normal to below normal precipitation within their boundaries.

The first week of May has been relatively mild with limited precipitation and seasonal temperatures. The upcoming weather forecast is for similar conditions, with no signs of another extended heat wave or extreme precipitation.

## Snowpack

Snow basin indices (SBI) for May 1<sup>st</sup>, 2021 range from a low of 64% of normal in the Nicola to a record high of 223% in the Northwest (Table 1 and Figure 2). Overall, the province has slightly above normal snowpack for May 1<sup>st</sup>, 2021, with an average of all snow measurements across B.C. of 106% (decreasing slightly from the April 1<sup>st</sup> value of 113%). Below normal snowpack (60-80% of normal) was measured in the Nicola / Lower Thompson. Slightly below normal snowpack (80-90%) was measured in the South Thompson, Bridge and Skagit. Regions with normal snowpack (90-110%) include the North Thompson, Quesnel, Upper Columbia, West Kootenay, East Kootenay, Okanagan, Boundary, South Coast, Vancouver Island, Peace, and Skeena-Nass. Slightly above normal snowpack (110-125%) was measured in the Upper Fraser East, Upper Fraser West, Nechako, Lower Fraser, and Similkameen. Well above normal snowpack (>130%) was measured in the Central Coast, Stikine, Liard, and Northwest. The overall snow basin index for the entire Fraser River basin (e.g. upstream of the Lower Mainland) decreased to 109% from the April 1<sup>st</sup> index of 116%. A table of SWE amounts for the individual sites used to calculate SBI values best describes specific conditions for each area and is included in the final pages of this report.

**Table 1 - BC Snow Basin Indices – May 1, 2021**

Basin	% of Normal (Apr 1st value)	Basin	% of Normal (Apr 1st value)
Upper Fraser West	117 (132)	Okanagan	91 (109)
Upper Fraser East	124 (122)	Nicola**	64 (108)
Nechako	115 (119)	Boundary	91 (103)
Middle Fraser	90 (108)	Similkameen	110 (112)
Lower Thompson*	77 (122)	South Coast	109 (118)
Bridge*	84 (103)	Vancouver Island	102 (110)
Chilcotin*	N/A (125)	Central Coast	163 (146)
Quesnel*	104 (109)	Skagit	84 (116)
Lower Fraser	117 (123)	Peace	108 (112)
North Thompson	99 (103)	Skeena-Nass	108 (115)

Basin	% of Normal (Apr 1st value)	Basin	% of Normal (Apr 1st value)
South Thompson	80 (100)	Stikine	131 (135)
Upper Columbia	103 (108)	Liard	154 (133)
West Kootenay	91 (100)	Northwest	223 (200)
East Kootenay	94 (93)	Fraser	109 (116)
		British Columbia	106 (113)

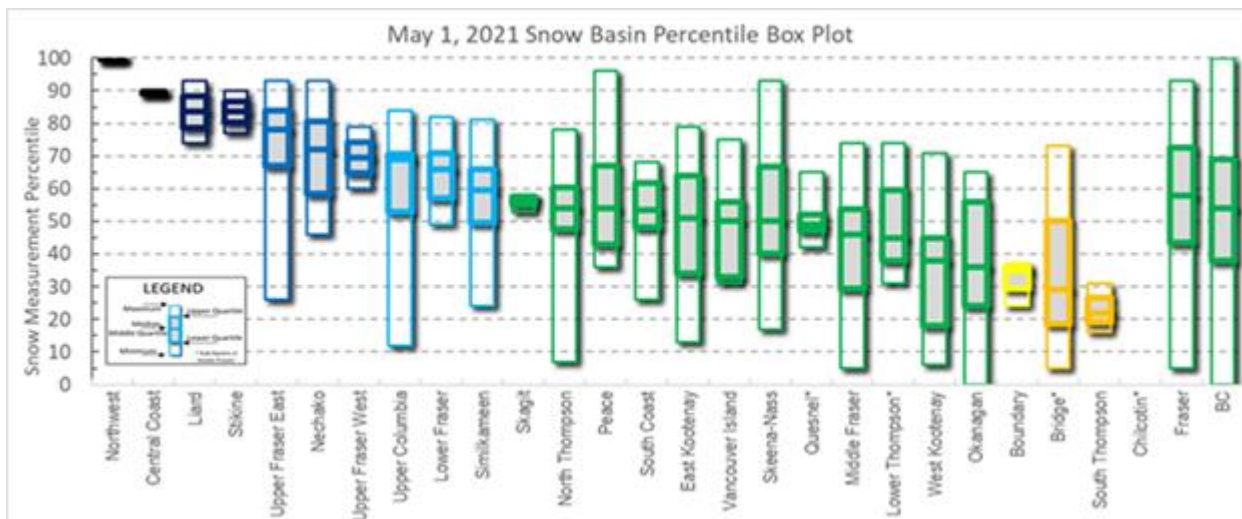
\*\*sub-basin of Lower Thompson – includes representative stations within Okanagan

Two manual snow surveys in the Northwest recorded all-time record high values for May 1<sup>st</sup>, including:

- 4E01 Log Cabin: 761 mm SWE (203% of normal) – 62 years of record
- 4E02B Atlin Lake: 153 mm SWE (442% of normal) – 14 years of record

Percentiles calculated for each site within a basin offer a more accurate interpretation of snowpack variability, especially in regions where the percent of normal is extremely high or low. For example, the average May 1<sup>st</sup> percentile for all sites within the Central Coast region is the 90<sup>th</sup> percentile. This means that historical May 1<sup>st</sup> values for these sites in aggregate were below current values 90% of the time in the historic record, and snowpack was higher than current values 10% of the time. The region with the highest average percentile is the Northwest (100<sup>th</sup> percentile), indicating that all stations within this region measured all-time record high SWE values. The region with the lowest average percentile is the South Thompson (23<sup>rd</sup> percentile). A box plot displaying percentile ranges ordered from highest to lowest median, including sub-basins of the Middle Fraser, is provided below in Figure 1. It is useful to compare the following box plot with a region’s calculated SBI. For example, the SBI of the Upper Columbia is 103% of normal, whereas the median percentile for snow measurement sites is above normal at the 69<sup>th</sup> percentile, demonstrating how one or two very low measurements can skew the SBI.

**Figure 1: Snow Basin Percentile Box Plot – May 1<sup>st</sup>, 2021**  
**To BE UPDATED**



## Outlook

La Niña conditions persisted through winter and early spring. According to the Climate Prediction Center (CPC), there is an 80% chance of transitioning from La Niña to ENSO-neutral conditions during May-July 2021. Historically, La Niña conditions can lead to cooler temperatures for British Columbia in April, resulting in delayed snowmelt and continued snow accumulation in the mountains. This did not occur in April 2021.

During the spring snowmelt period (freshet), short and mid-range weather forecasts are more critical (and more accurate) compared to seasonal weather predictions. In mid-April, a strong high-pressure ridge formed across the entire province, resulting in many locations measuring maximum daily temperatures records for the date. This very warm weather initiated the snowmelt season, particularly for watersheds at lower and mid-elevations. The BC River Forecast Centre issues advisories and warnings in the Cariboo, Chilcotin Plateau, Bonaparte River and Prince George area. Fortunately, due to very warm temperatures in December and January, there was below normal seasonal snowpack at lower elevations, which lessened the intensity of river flows from the initial heat wave.

In other areas of the province, the warm weather in mid-April was likely a positive with respect to freshet-related flood risks as it created an initial pulse of snowmelt-derived flows, which may dampen the intensity of peak flows later in the season. Many regions also dropped from above normal snowpack on April 1<sup>st</sup> to normal or slightly below normal snowpack on May 1<sup>st</sup> because of snowmelt stemming from the mid-month warm weather. Regions with relatively high snowpack may still be susceptible to snowmelt-related flooding, including the Upper Fraser East, Central Coast, Stikine, Northwest and Northeast. In the South Interior, spring flooding is still a possibility through a combination of rapid snowmelt and rainfall, or intense rainfall alone.

Seasonal volume runoff forecasts (see full report) decreased as compared to the April 1<sup>st</sup> forecast. This is due to the relatively dry April weather in combination with the mid-April heat that resulted in seasonally high, snowmelt dominated flows. Seasonal volume runoff forecasts are slightly above normal (110-120%) for the Upper Fraser, Nicola River, Similkameen and Cowichan River. Near normal (90-110%) runoff forecasts are predicted for the Middle Fraser, Thompson, Bulkley/Skeena, Nicola Lake and Okanagan Lake. Below normal (<90%) runoff is expected in Okanagan Lake and Kalamalka-Wood Lake. Near normal snowpack on Vancouver Island and the South Coast indicates the potential for normal runoff in watersheds with significant areas at higher elevations.

Typically, 100% of the annual BC snowpack has accumulated by early May, where the provincial snowpack normally peaks in mid-April. Lower elevation snow sites usually start to melt prior to May 1<sup>st</sup>, while high elevation snow stations can continue to accumulate snow into May (depending on weather conditions). Based on the automated snow weather stations (ASWS), snowpack across the province peaked on April 15<sup>th</sup>; by May 1<sup>st</sup>, 11% of the total snowpack measured by these stations had melted. In comparison, 4.5% of snowpack measured by of the ASWS in 2020 melted from April 15<sup>th</sup> to May 1<sup>st</sup> (a more typical melt value), indicating that more snow has melted this season relative to the past.

While snowpack is one risk factor for freshet flooding, snowpack alone cannot predict whether flooding will occur. Spring weather is also critical, where the timing and severity of temperature and rainfall patterns are important drivers of flooding irrespective of snowpack. Spring freshet

poses a seasonal risk across the BC Interior. Scenarios that could exacerbate flood risk this year include prolonged cool weather followed by a rapid shift to persistent hot weather (particularly in mid to late-May), or persistent wet weather or extreme short-term rainfall which can occur into July. Favourable scenarios would include continued dry weather and seasonal temperatures.

The River Forecast Centre will continue to monitor snowpack conditions and will provide an updated seasonal flood risk forecast in the May 15<sup>th</sup> 2021 bulletin, which is scheduled for release on Friday, May 21<sup>st</sup>.

BC River Forecast Centre  
May 7, 2021